Procurement of Environmentally Preferable Products:
A Review of Current Practices

Volume I

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Massachusetts Executive Order No. 350, issued February 3, 1993, requires that State agencies ensure that they fully comply with environmental regulations of the Commonwealth and include preventive environmental measures in their operations. The Executive Order further requires that State agencies institute a program for purchasing recycled goods and using environmentally up-to-date equipment. In accordance with Executive Order 350, Agencies charged with implementing programs to purchase recycled and environmentally up-to-date goods are setting purchasing guidelines and standards for environmentally preferable products (EPP). EPP attributes include, but are not limited to:

- products with recycled content
- waste-reducing products
- energy/water-efficient products
- less/non-toxic products.

As one input to the process of setting EPP guidelines and standards, three State agencies - the Department of Procurement and General Services (DPGS), the Executive Office of Environmental Affairs (EOEA) and the Department of Environmental Protection (DEP) - contracted with Abt Associates Inc. of Cambridge, MA to research the criteria defining EPPs currently in use by selected government and private organizations[1]. This report summarizes the research and identifies specific EPP criteria for the Commonwealth of Massachusetts to consider adopting.

METHODOLOGY

For this project, Abt Associates focused on compiling a database indicating the EPP criteria in existence at certain local, state, federal, and foreign government agencies as well as at private sector organizations[2]. Examining existing practices is an effective means of gathering information on such issues as:

- Which EPP attributes are commonly specified by organizations?
- What are some of the "cutting edge" EPP attributes that are emerging?
- Which of the specifications are the most and least successful (including considerations of price, performance, availability, and customer response)?

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[1] For brevity 's sake, the remainder of this report refers to DPGS rather than the three agencies that sponsored this report.

[2] The product criteria included in the database are associated with a range of actual purchasing actions. In some cases, purchase of a product meeting criteria may be a goal without any associated purchasing requirements. In this case, an organization may have EPP criteria and not purchase any, or many, EPPs. In other cases, an organization may require (e.g., via legislation or executive order) that a product meet specified criteria. Alternately, price preferences may be in place for products meeting the criteria.

We obtained information on EPP standards via a written questionnaire sent to fifty states, three counties, fifty-five businesses, and six non-profit organizations regarding their EPP purchasing. The questionnaire requested information on existing EPP specifications, quantities of EPP purchased, criteria used in evaluating EPP, means of implementing EPP specifications, and systems used to evaluate the success of EPP programs. We received responses from twenty-nine states, two counties, eleven businesses, and four non-profit organizations. (See Chapter 2 for list of respondents.) The resulting database consolidates data on a broad range of purchasing practices for a multitude of products (See Volume II). We recognize, however, that many organizations that we did not contact, or that did not respond, also have EPP standards, which may vary from those reported here.

In addition to reporting the purchasing practices of organizations, our database incorporates the environmental product standards of six government or independent organizations that define EPP standards for use by other organizations. For example, the German government issues environmental seals of approval through their *Blue Angel* program for products that meet certain environmental standards. *Blue Angel* standards are included in the database. (See Chapter 2 for a list of standard setters included in the database.)

We conducted further research on products of particular interest to the Commonwealth. We prioritized products based on four criteria:

(1) the frequency with which respondents to the questionnaire mentioned a product standard. We expected that product standards in common use would be relatively easy to adopt. Therefore, such products were given a higher priority;

(2) the dollar value of Massachusetts Executive Agency purchases of the product. Products accounting for substantial expenditures were given a higher priority;

(3) the apparent environmental impact of switching from the common product-attribute to the environmentally-preferable product-attribute. Because the research for this report focused on purchasing practices and touched only peripherally on environmental impact of products, the evaluation of environmental impact is preliminary. Nonetheless, we included this criterion because the environmental impact of the products is the underlying motivation for the project;

(4) whether DPGS already had adequate in-house information on the product standard. If adequate information was available, we did not consider the product further.

Our follow-up research consisted largely of telephone calls to organizations knowledgeable about certain product attributes as indicated by their response to the questionnaire. We asked these organizations for further details regarding the products' price, performance, and availability.

RESULTS[3]

We identified well over one hundred general product categories for which either the survey respondents or the standard-setting organizations have standards based on environmental impacts. The most frequently mentioned product category was paper, including many paper types such as tissue, printing/writing paper, and newsprint. Other general product categories frequently mentioned include:

- antifreeze (re-refined)
- batteries (rechargeable, returnable, recycled content, limited mercury content)
- cardboard (recycled content)
- cleaning products (less toxic)
- compost (general use)
- computers (energy efficient)
- glass (recycled content)
- insulation (recycled content)
- lights (energy efficient)
- oil (recycled content)
- packaging (recycled content, recyclability)
- paint (returnable packaging, recycled content, VOC limits, less toxic)
- plastic bags (recycled content)
- plastic carpet (recycled content)
- plastic lumber (recycled content)
- plastic traffic barricades and signs (recycled content)
- tires (retreaded)
- toner cartridges (remanufactured)
- vehicles (alternative fuel, remanufactured parts, energy efficient, noise control, air emission limits)

The product attribute for which most standards exist is the recycled content of products. Purchasing paper products with recycled content is, for many organizations, the step that initiates an EPP purchasing program. However, recycled content standards also exist for many other products, such as re-refined oil, steel, and plastic lumber.

Several organizations have also implemented environmental product standards based on the toxicity of products. Products with toxicity-based standards include batteries, cleaning products, ink, insecticides, insulation, and paint.

Other product attributes that have been used to define standards include:

- product recyclability (e.g., batteries, packaging)
- energy efficiency (e.g., computers, lights, vehicles)

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[3] The conclusions of this project rely on the data received from other organizations via the questionnaire and follow-up contacts. Note, in particular, that we proceeded from the assumption that those products indicated to be environmentally preferable by survey respondents, are, in fact, associated with environmental benefits.

- air pollution (e.g., boilers, cleaning products, paint, vehicles)
- waste reducing products (e.g., returnable containers for chemicals)
- water consumption (e.g., plumbing fixtures)
- water pollution (e.g., cleaning products, pesticides)
- natural resource impact (e.g., wood from sustainably harvested forests)

With DPGS, we assessed products for further research based on the criteria presented in the discussion of methodology. We identified the following eleven products as priorities for additional research:

- Carpeting from recycled materials
- Compost
- De-icers and anti-skid agents
- Energy efficient computer hardware
- Less toxic cleaning products
- Non-chlorine bleached printing/writing paper and unbleached or non-chlorine bleached tissue paper
- Organic food
- Recycled printing/writing paper with post-consumer recycled content of 20 percent or greater
- Re-refined oil
- Retreaded tires
- Soy-based inks

We also identified a second tier of products for which further research is desirable but not feasible within the resources of this project. The products are:

- Concrete from recovered materials
- Energy efficient appliances
- Energy efficient and alternative fuel vehicles
- Energy efficient lighting
- Insulation from recycled materials
- Less toxic caulking
- Plastic bags from recycled materials
- Plastic pipes from recycled materials
- Products from used rubber
- Re-refined antifreeze
- Rechargeable and less toxic batteries
- Recycled and recyclable packaging
- Recycled and less toxic paint
- Wood debris chips for landscaping

In addition to the findings regarding criteria for specific products, the survey provided information about four aspects of EPP purchasing programs. First, the survey addressed the product attributes considered by organizations in setting environmental standards. The results are consistent with the product attributes on which EPP standards are, in fact, based. Every respondent indicated that their standards consider the recycled content of products. Many

organizations stated that they also considered recyclability, energy efficiency, toxicity, and waste reduction. Attributes that were less commonly considered were natural resource impacts, air pollution, water pollution, water consumption, and habitat preservation.

Second, the survey requested information regarding the basis for setting criteria. Commonly, organizations set EPP standards based on the precedent set by another organization. The standards of the U.S. Environmental Protection Agency appear to be the most influential. Several organizations also reported conducting research on environmental impacts of products and/or convening an expert panel to consider EPP standards.

Third, the survey obtained information on respondents' means of implementing EPP criteria. An organization may use EPP criteria in a variety of ways. For example, an organization with EPP criteria may merely informally encourage use of products that meet the criteria. Or, an organization may require that products meet the criteria. Alternately, an organization may set a price preference for products meeting the criteria. The means of implementing EPP criteria may also vary by product within a single organization. For example, EPP product criteria that are not well established in the market place may be optional while established EPP product criteria are mandatory.

The responses to the questionnaire indicate that mandatory criteria are used most frequently, followed by institution of price preferences and the development of optional criteria. Existing price preferences are most often used to achieve a recycling criterion and typically range from 5 to 10 percent.

Finally, the survey gathered information on the respondents' basis for evaluating EPP purchasing programs. It is important to determine the effects of purchasing programs both to continually improve the programs and to determine their value. Program evaluation could track several issues. First, the level of program activity could be tracked based on the level of EPP purchases. Tracking purchases was the most common evaluation method indicated by the questionnaire respondents. Organizations could also evaluate the effects of EPP programs on the marketplace by tracking changes in vendors' products and increases in the number of vendors offering EPPs. About half of the organizations tracked these vendor changes.

Ideally, organizations could also evaluate the costs and benefits of EPP programs. It is extremely challenging and time consuming, however, to quantify, let alone monetize, the benefits of purchasing EPP. Several organizations noted that they obtain feedback from products users which may provide insight into both the costs and the benefits of EPPs. Several organizations also track the additional product costs, if any, of purchasing EPPs. However, no organizations reported tracking the administrative costs associated with defining and purchasing EPPs.

RECOMMENDATIONS

The focus of our recommendations is product-specific. That is, we recommend product-attribute combinations that DPGS should strongly consider adopting immediately as EPP standards as well as those product-attributes that may provide opportunities to improve the environment in the longer term. While the data we gathered from EPP users provide solid indications of the desirability of adopting the product standards, in some cases, DPGS should

further investigate details that were not fully clarified by the current users. Our recommendations take into consideration that Massachusetts is relatively advanced in the purchase of EPPs, having existing EPP standards for a number of products. Certain product-attributes are not mentioned because Massachusetts already has standards for them or is investigating them separately. The reader should be aware that environmental criteria for many products not specifically recommended in this report may be worth adopting.

We had adequate information to make a recommendation regarding the adoption of EPP standards only for those eleven products for which we gathered information in addition to that obtained from the survey. Due to differences in the purchasing status of non-chlorine bleached printing/writing paper in comparison to tissue paper, we split this product group into two. We present our recommendations in three categories:

(1) EPP standards that appear highly effective. Based on the information gathered for this report, the product-attributes in this category can be obtained at *little or no additional expense* and are associated with a *significant environmental benefit*. Our consideration of cost includes the product's performance and availability as well as any price premium demanded for the product. We recommend that DPGS proceed immediately towards adopting these product-attributes as EPP standards.

(2) EPP standards that appear effective. Based on the information presented in the previous chapters, the product-attributes in this category can be obtained at *little or moderate additional expense* and are associated with *moderate environmental benefits*. We recommend that DPGS actively continue to investigate the adoption of these product-attributes as EPP standards. We outline specific areas of investigation.

(3) EPP standards that do not currently appear effective. The costs of obtaining product-attributes in this category appear to outweigh the environmental benefits of the products. We recommend that DPGS continue to monitor the status of these products.

In addition to grouping the products into the three categories, this report discusses the motivation for designating the products as environmentally preferable as well as the areas in which further investigation is needed prior to setting an EPP standard.

Product-attributes that appear highly effective include:

- retreaded tires
- re-refined motor oil
- printing/writing paper with post-consumer recycled content of 20% or greater
- energy efficient computer hardware
- non-chlorine bleached and unbleached tissue paper
- compost

Product-attributes that appear effective include:

- less and non-toxic cleaning products

- soy-based inks
- non-chlorine bleached printing/writing paper
- carpeting from recycled materials

Product-attributes that do not currently appear effective include:

- Less toxic de-icers and anti-skid agents
- Organic foods

In addition to the product-specific recommendations provided in this report, we briefly offer two broader recommendations regarding Massachusetts' EPP purchasing program. First, we recommend that Massachusetts coordinate their EPP purchasing with purchasing agencies in other states. This project has proven that many states are pursuing EPPs and that the accumulated research and experience can be beneficially shared. The level of coordination could range from initiating an electronic bulletin board on EPPs that would allow for ongoing exchange of information to issuing combined requests for bids for certain EPPs. Such coordination with other states can reduce product research costs, assist Massachusetts with staying up to date with EPP purchasing practices, and, in some cases, may increase market power and draw new vendors to the market. We provide specific suggestions regarding state contacts and means of communication in a memorandum delivered to DPGS under this contract entitled, "*Remaining Current with Environmentally Preferable Product Standards"*.

Second, we recommend that Massachusetts consider choosing one or more standard setting organizations (e.g., Energy Star, Environmental Choice, Blue Angel, Green Seal) to rely on for guidance in developing their EPP purchasing program.[4] The level of involvement with such a program could have a broad range. At a minimum, Massachusetts could commit to simply obtaining and reviewing all the EPP standards developed by the organization. Used in this manner, the standard setting organization could serve to indicate new EPPs available and changes in product criteria that Massachusetts may want to adopt. At the other extreme, Massachusetts could commit to adopting the standards set by another organization. Coordination with a standard setting organization has benefits similar to coordination with other states: reduced product research costs, assistance with staying current with EPP purchasing practices, and, to the extent that other organizations adhere to the same standards, increased market power.

To choose one or more standard setting programs to rely on for guidance, Massachusetts should consider the following issues:

- For what products does the program currently have standards? Are the major products of concern to Massachusetts covered? Is the product coverage adequately extensive?

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4 See Chapter 2 for a description of these organizations.

- Do the product criteria cover a broad range of attributes (e.g., toxicity, recyclability, energy efficiency)? Are the means by which product criteria are chosen transparent to the user? Is there adequate justification for the criteria? Was input regarding the criteria obtained from the entire range of interested/affected parties?

- Is the program stable, i.e., is funding available and does the program have broad acceptance?

- Does the program certify the environmental claims of vendors? If the program does not certify claims, can Massachusetts obtain satisfactory certification via other means such as the written verification of vendors? If the program does certify claims, would the costs to vendors be prohibitive, especially to small vendors?

- Does the program offer assistance/advice to its adherents? Does the program publicize the activities of its adherents?

The combination of efficient contacts with state purchasing agencies and employing the services of standard-setting organizations should ensure that Massachusetts is aware of innovative and advanced EPP purchasing practices and opportunities.

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CHAPTER 1: INTRODUCTION

PURPOSE

Massachusetts Executive Order No. 350, issued February 3, 1993, requires that State Agencies ensure that they fully comply with environmental regulations of the Commonwealth and include preventive environmental measures in their operations. The Executive Order further requires that State Agencies institute a program for purchasing recycled goods and using environmentally up-to-date equipment. In accordance with Executive Order 350, Agencies charged with implementing programs to purchase recycled and environmentally up-to-date goods are setting purchasing guidelines and standards for environmentally preferable products (EPP). EPP attributes include, but are not limited to:

- products with recycled content
- waste-reducing products
- energy/water-efficient products
- less/non-toxic products.

As one input to the process of setting EPP guidelines and standards, three State Agencies - the Department of Procurement and General Services (DPGS), the Executive Office of Environmental Affairs (EOEA) and the Department of Environmental Protection (DEP) - contracted with Abt Associates Inc. of Cambridge, MA to research the criteria defining EPPs currently in use by selected government and private organizations[5]. This report summarizes the research and identifies specific EPP criteria for the Commonwealth of Massachusetts to consider adopting. Note that the purpose of this report is *not* to comprehensively research the environmental impacts of products purchased by the Commonwealth. Rather, the report will be used to efficiently guide the State's purchasing policies towards products commonly accepted as environmentally preferable.

STRUCTURE OF REPORT

For this project, Abt Associates focused on compiling a database indicating the EPP criteria in existence at certain government and private organizations. We hoped to efficiently advance the State's purchasing practices regarding EPPs by assessing those practices which have proven successful at other organizations.

This report is presented in two volumes. Volume I contains three chapters in addition to this introduction. The following chapter describes the questionnaire that we administered to gather information on EPP purchasing as well as the organizations to which we sent the questionnaire. Chapter 2 also includes a summary of the responses to the questionnaire. In Chapter 3, we summarize further research that we conducted on products of particular interest to the Commonwealth. We prioritized products based on both the frequency with which respondents to the questionnaire mentioned the products and the level of Massachusetts

[5]For brevity 's sake, the remainder of this report refers to DPGS rather than the three agencies that sponsored this report.

purchases of the products. We also considered the products' environmental impacts and the in-house information already available to the Commonwealth. Our follow-up research consisted largely of telephone calls to organizations knowledgeable about certain product attributes as indicated by their response to the questionnaire. We asked these organizations for further details regarding the products' price, performance, and availability. In the final chapter of this volume, we translate the information provided in the previous chapters into recommendations for the Commonwealth of Massachusetts. We recommend product-attribute combinations that DPGS should strongly consider adopting immediately as EPP standards as well as those product-attributes that may provide opportunities to improve the environment in the longer term.

Volume II of this report contains a copy of the questionnaire sent to organizations to obtain information on EPP criteria as well as detailed tables reporting the responses to the questionnaire.

CONTEXT

While many government and private organizations are involved in identifying and purchasing EPPs, information regarding organizations' experience in this area is obtained largely through exchanges of anecdotal information. This document provides a reference for organizations seeking solid information on the status of EPP purchasing.

We recognize, however, that this report is issued in the midst of a rapidly changing environment. New environmentally preferable products are constantly emerging and the performance of EPPs is continually improving. Consequently, the standards defining EPPs are frequently updated. For example, the U.S. Environmental Protection Agency recently published an updated listing of items that are or can be produced with recovered materials. Any procuring agency, when using appropriated Federal funds to procure a listed item, must purchase it with the highest percentage of recovered materials practicable. (*Federal Register*, May 1, 1995) EPA also published recommendations to procuring agencies for meeting the purchasing obligations with respect to the designated items. Many government and private organizations rely on these EPA standards for determining their own EPP standards.

Due to product advancement and corresponding changes in EPP standards, the information provided in this report may rapidly become outdated. Therefore, in conjunction with this report, we have delivered to DPGS a memorandum entitled "*Remaining Current with Environmentally Preferable Product Standards"*. Through the research conducted for this report, we identified key contacts for information on EPP purchasing. The memorandum suggests key individuals and organizations to contact to stay current with EPP purchasing practices as well as specific means of communication (e.g., an electronic bulletin board). To maximize the usefulness of this report and the associated database, they should be used not only as current reference documents but also as the foundation for staying abreast of EPP purchasing practices.

We also recognize that several systems exist or are being developed that provide a framework for defining EPPs. For example, the U.S. EPA has published draft guidance designed to assist Federal Executive agencies in the identification and acquisition of environmentally preferable products. The non-profit organization *Green Seal* has developed an "Environmental

Partners" program through which organizations commit to certain purchasing practices and use *Green Seal* as a resource for their EPP purchasing program. The State of Minnesota has developed a check list that may be used to identify EPPs. The private organization *Scientific Certification Systems* works as a labeling and certification business to assist in identifying EPPs. Government-sponsored environmental standard-setting program exist in several countries including Canada, Germany, and Japan. If the reader is interested in frameworks for defining EPPs, rather than the status of particular products, he may wish to investigate these and other sources.

CHAPTER 2: EPP QUESTIONNAIRE DESIGN AND RESULTS

Abt Associates' evaluation of existing criteria for environmentally preferable products (EPPs) is based on a survey administered to certain public and private organizations. It is hoped that the documentation of existing EPP criteria can guide other organizations in considering and adopting EPP criteria. For example, the data indicates EPP criteria that are becoming conventional and thus may be adopted with relative ease. The data also provides contact organizations which have experience in implementing EPP criteria for various products.

In this chapter, we discuss the questionnaire design, the surveyed organizations, and the results of the survey.

QUESTIONNAIRE DESIGN

We designed a brief (2 page) written questionnaire the primary purpose of which was to gather data on existing products standards based on environmental impacts. (A copy of the questionnaire is included in Volume II.) The questionnaire also addressed:

- the product attributes considered in evaluating product environmental preferability
- the basis for setting standards developed to reduce environmental impact (e.g., followed precedent of other organization, conducted research on environmental impacts)
- the means of implementing EPP standards
- the basis for evaluating the success of EPP standards.

ORGANIZATIONS SURVEYED

We were chiefly interested in the purchasing practices of organizations similar to the Commonwealth's Department of Purchasing and General Services (DPGS). Thus, in April, 1995, we telefaxed the questionnaire to the National Association of State Purchasing Agents (NASPO) contact for each of the fifty states[6]. We received substantive responses from the following twenty-nine states:

STATES THAT PROVIDED SUBSTANTIVE RESPONSES TO Abt Associates' EPP QUESTIONNAIRE

AZ, AR, CA, CT, FL, GA, IL, KY, LA, ME, MA, MN, MS, MO, MT, NE, NJ, NM, NY, OH, OR, PA, RI, SC, TN, VT, WA, WI, WY

[6]Note that the percentage of state purchases made through state purchasing offices varies among states. In general, a substantial portion of a state's purchases may be made outside of the state purchasing offices.

We also surveyed three counties, 55 private businesses, and six non-profit organizations. We selected these organizations based on their reputation as being proactive in addressing environmental issues. Certainly, other organizations also set environmental product standards but resource limitations did not allow for a comprehensive survey of every organization with such standards. We received responses from two counties, eleven private businesses, and four non-profit organizations. (See Table 1.) We also input data on the EPP criteria for United Nations offices.

Table 1
Counties, Businesses, & Non-profit Organizations Providing Substantive Responses to Abt Associates' EPP Questionnaire

Counties	Businesses	Non-profit organizations
King County, WA	Aquapore Moisture Systems, Inc.	National Audobon Society
Santa Monica, CA	Bandag, Inc.	National Wildlife Federation
	Bank of America	Rocky Mountain Institute
	Bell Atlantic Corporation	World Resources Institute
	Body Shop	
	Mary Kay Cosmetics, Inc.	
	Nordstrom, Inc.	
	Real Goods Trading Corporation	
	Saunders Hotel Group	
	Warner-Lambert Company	
	Wisconsin Tissue Mills	

In addition to the questionnaire responses, we obtained information from six government or independent organizations that define EPP standards for use by other organizations. The standard setting organizations included in this report are:

- Blue Angel - the German government's environmental label
- Canada Environmental Choice - the Canadian government's environmental label

- U.S. Environmental Protection Agency - including
    - *Comprehensive Guideline for Procurement of Products Containing Recovered Materials* (Federal Register 5/1/95) - which designates items that are or can be produced with recovered materials. Under RCRA section 6002, any procuring agency, when using appropriated Federal funds to procure a designated item, shall purchase it with the highest percentage of recovered materials practicable. This document includes products specified for inclusion in affirmative procurement programs in Executive Order 12873.
    - *Recovered Materials Advisory Notice* (Federal Register 5/1/95) - EPA's recommendations to procuring agencies for meeting their section 6002 obligations with respect to designated items.
        - *Paper Products Recovered Materials Advisory Notice* (Federal Register 3/15/95) - EPA's draft guidance to procuring agencies regarding recommended minimum recovered materials content in paper.
    - *Energy Star Computer Program* - EPA's energy-efficiency program for computers.

4. Conservatree Paper Company - which has developed standards for recycled paper called the "Mobro Principles".

5. Green Seal - a non-profit organization that issues a seal of approval to consumer products that meet certain environmental standards.

6. Scientific Certification Systems - an organization that documents the environmental claims of products.

While other standard setting organizations exist (mostly those of foreign governments), those listed above are among the most comprehensive.

SURVEY RESULTS

The results of our survey indicate that most state purchasing agencies, as well as many private businesses, actively purchase EPPs to varying extents. Recycled paper is the most frequently purchased EPP, but environmental standards exist for dozens of other products and incorporate many attributes other than recycled content.

Tables 5 through 7 in Volume II present the core results of the survey: the product standards for the responding organizations[7]. The three tables sort the data by different variables: Table 5 is organized by product, Table 6 by organization, and Table 7 by environmental attribute (e.g., recycled content). In this chapter, we briefly summarize our findings.

We identified well over one hundred general product categories for which either the survey respondents or the standard-setting organizations have standards based on environmental impacts. The most frequently mentioned product category was paper, including many paper types such as tissue, printing/writing paper, and newsprint. Nearly every organization with environmental product standards had standards for the recycled content of paper. While products were often categorized differently between organizations, the other general product categories frequently mentioned include:

- antifreeze (re-refined)
- batteries (rechargeable, returnable, recycled content, limited mercury content)
- cardboard (recycled content)
- cleaning products (less toxic)
- compost (general use)
- computers (energy efficiency)
- glass (recycled content)
- insulation (recycled content)
- lights (energy efficiency)
- oil (recycled content)
- packaging (recycled content, recyclability)
- paint (returnable packaging, recycled content, VOC limits, less toxic)
- plastic bags (recycled content)
- plastic carpet (recycled content)
- plastic lumber (recycled content)
- plastic traffic barricades and signs (recycled content)
- tires (retreaded)
- toner cartridges (remanufactured)
- vehicles (alternative fuel, remanufactured parts, energy efficient, noise control, air emission limits)

We grouped the attributes of the products that impacted the environment into twelve general categories. By far, the product attribute for which most standards exist is the recycled content of products. We loosely define "recycled" to include use of recovered products (e.g., concrete with recovered fly ash) and re-refined materials (e.g., motor oil). Efforts to buy products with recycled content are well entrenched at the Federal and State levels as well as among private businesses. Purchasing paper products with recycled content is, for many organizations, the step that initiates an EPP purchasing program. However, recycled content standards also exist for many other products, such as re-refined oil, steel, and (plastic) lumber.

[7]We entered the data provided in the written questionnaire responses into a computer program The data is subject to error to the extent that we may have misread or misinterpreted responses. Resource constraints precluded a review of the results by all questionnaire respondents.

Several organizations have also implemented environmental product standards based on the toxicity of products. Products with toxicity-based standards include batteries, cleaning products, ink, insecticides, insulation, and paint.

Other product attributes that have been used to define EPP standards include:

- product recyclability (e.g., batteries, packaging)
- energy efficiency (e.g., computers, lights, vehicles)
- air pollution (e.g., boilers, cleaning products, paint, vehicles)
- waste reducing products (e.g., returnable containers for chemicals)
- water consumption (e.g., plumbing fixtures)
- water pollution (e.g., cleaning products, pesticides)
- natural resource impact (e.g., wood from sustainably harvested forests)

Four additional survey questions addressed EPP programs. The responses by organization are shown in Tables 1 through 4 in Volume II. We briefly discuss the results here.

Figure 1 summarizes the product attributes considered by organizations in setting environmental standards (from question # 3 of the questionnaire). The results are consistent with the product attributes on which EPP standards are, in fact, based. Every respondent indicated that their standards consider the recycled content of products. Many organizations stated that they also considered recyclability, energy efficiency, toxicity, and waste reduction. Attributes that were less commonly considered were natural resource impacts, air pollution, water pollution, water consumption, and habitat preservation.

Figure 2 summarizes the basis for setting criteria (from question #4 of the questionnaire). Commonly, organizations set EPP standards based on the precedent set by another organization. The standards of the U.S. Environmental Protection Agency appear to be the most influential. Several organizations also reported conducting research on environmental impacts of products and/or convening an expert panel to consider EPP standards.

Figure 3 presents the respondents' means of implementing EPP criteria (from question #5). These data are valuable in interpreting the practical meaning of EPP criteria. The existence of EPP criteria at an organization may have various meanings. An organization with EPP criteria may merely informally encourage use of products that meet the criteria. Or, an organization may mandate that products meet the criteria. Alternately, an organization may set a price preference for products meeting the criteria. The means of implementing EPP criteria may also vary by product within a single organization. For example, EPP product criteria that is not well established in the market place may be optional while established EPP product criteria is mandatory.

The responses to the questionnaire indicate that mandatory criteria are used most frequently, followed by institution of price preferences and the development of optional criteria. Existing price preferences are most often used to achieve a recycling criterion and typically range from 5 to 10 percent.

Figure 4 presents the respondents' basis for evaluating EPP purchasing programs (from question #6). It is important to determine the effects of purchasing programs both to continually improve the programs and to determine their value. Program evaluation could track several issues. First, the level of program activity could be tracked based on the level of EPP purchases. Tracking purchases was the most common evaluation method indicated by the questionnaire respondents.

Organizations could also evaluate the effects of EPP programs on the marketplace by tracking changes in vendors' products and increases in the number of vendors offering EPPs. About half of the organizations tracked these vendor changes.

Ideally, organizations could also evaluate the costs and benefits of EPP programs. It is extremely challenging and time consuming, however, to quantify, let alone monetize, the benefits of purchasing EPP. Several organizations noted that they obtain feedback from products users which may provide insight into both the costs and the benefits of EPPs. Several organizations also track the additional product costs, if any, of purchasing EPPs. However, no organizations reported tracking the administrative costs associated with defining and purchasing EPPs.

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CHAPTER 3: ADDITIONAL RESEARCH ON SELECTED EPPS

Abt Associates conducted further research on selected EPPs of particular interest to the Commonwealth for the purpose of making recommendations regarding adoption of product standards. With input from DPGS, we selected the products for further research based on four criteria:

(1) the frequency with which respondents to the questionnaire mentioned a product standard. We expected that product standards in common use would be relatively easy to adopt. Therefore, such products were given a higher priority;

(2) the dollar value of Massachusetts Executive Agency purchases of the product. Products accounting for substantial expenditures were given a higher priority;

(3) the apparent environmental impact of switching from the common product-attribute to the environmentally-preferable product-attribute. Because the research for this report focused on purchasing practices and touched only peripherally on environmental impact of products, the evaluation of environmental impact is preliminary. Nonetheless, we included this criterion because the environmental impact of the products is the underlying motivation for this project;

(4) whether DPGS, EOEA, and DEP already had adequate in-house information on the product standard. If adequate information was available, we did not consider the product further.

Our follow-up research consisted of telephone calls to organizations knowledgeable about certain product attributes as indicated by their response to the questionnaire. When more organizations reported purchasing a product than we were able to contact, our selection of contacts was arbitrary. Our research focused on determining the level of success that organizations had experienced with the product standards as judged by:

- product availability
- price premiums required to purchase product
- product performance
- user response to product
- overall product prognosis.

The level of success experienced by organizations using various products can guide Massachusetts Executive Agencies in selecting products.

Below, we present details regarding organizations' experience with purchasing the following eleven products:

- Carpeting from recycled materials
- Compost
- De-icers and anti-skid agents
- Energy efficient computer hardware

- Less toxic cleaning products
- Non-chlorine bleached printing/writing paper and unbleached or non-chlorine bleached tissue paper
- Organic food
- Recycled printing/writing paper with post-consumer recycled content of 20 percent or greater
- Re-refined oil
- Retreaded tires
- Soy-based ink

Within each product discussion, we first briefly present the type of environmental benefit associated with the product. We then generally discuss the product's performance and price. Subsequently, we provide information on the experience of particular purchasers of the product. We conclude with a short prognosis for the product's procurement.

With DPGS, we also identified a second tier of products for which further research is not feasible within the resources of this project. Research of purchasers' experience with these products, similar to that which follows for the eleven priority products, is desirable. The second tier of products includes:

- Concrete from recovered materials
- Energy efficient appliances
- Energy efficient and alternative fuel vehicles
- Energy efficient lighting
- Insulation from recycled materials
- Less toxic caulking
- Plastic bags from recycled materials
- Plastic pipes from recycled materials
- Products from used rubber
- Re-refined antifreeze
- Rechargeable and less toxic batteries
- Recycled and recyclable packaging
- Recycled and less toxic paint
- Wood debris chips for landscape

CARPET MADE FROM RECYCLED MATERIALS

Carpet made from recycled materials usually consists of carpeting with fibers made from 100% recycled polyethylene terephthalate (PET), which is recovered primarily from clear plastic soda bottles. The coordinator of the Buy Recycled campaign in New Mexico cited an additional type of recycled carpet with fibers manufactured from used carpet fibers. The carpet backing is then used by the State Highway Department in road construction. (None of the purchasers contacted were familiar with any recycled carpets with fibers containing a blend of recycled and virgin plastic.)

Reviews of the quality of carpet made from recycled fibers differ between the organizations contacted. While two purchasers reported that the recycled carpet was indistinguishable from carpet made from virgin fibers, the other two noticed that it faded and looked worn more rapidly than virgin carpeting. Prices for recycled carpet vary between vendors. One manufacturer contacted reported that their prices are competitive with prices for virgin carpet, but one state reported that of the carpets on state contract, the recycled carpet was one of the most expensive.

Among those organizations and agencies that responded to Abt Associates' survey, four respondents reported using carpet made from recycled PET: New York, New Mexico, Nebraska and The Body Shop. The state of Florida has tested recycled carpeting, but has never purchased it. The EPA recommends that Federal procuring agencies utilize polyester carpet made with a postconsumer PET resin content between 25-100%.

In the paragraphs that follow, we provide further data about the organizations who reported using or researching recycled carpet.

New York

New York Office of General Services (OGS) purchased carpeting from a specialty carpet producer which tufts carpet with 100% PET yarn. After a year of use, it became apparent that the carpeting did not perform as well as carpets made with virgin fiber; discoloration was marked and the carpeting looked worn a short time after being installed. OGS cautions against its use in high traffic and high exposure areas.

An additional problem with the carpet is its high price. At $14.97 per square yard, it is one of the most expensive carpets offered by OGS's twelve vendors.

New Mexico

The New Mexico State Purchasing Department has a contract for carpet made from 100% recycled plastic fibers. The purchasing contract is with a distributor who deals with Image Industries, among others. To date, there have been no complaints and New Mexico seems to be satisfied with the quality of the carpeting. According to an Image Industries representative, they produce recycled carpet exclusively and have one hundred styles made with polyester recovered from recycled 2 liter soda bottles. The representative reports that polyester is naturally stain resistant and that they have never received a complaint about fading. Because soda bottles are

less expensive to use than virgin materials, Image reports that they are able to set their prices lower than those for virgin fiber carpets.

The Body Shop, Inc.

The Body Shop purchased carpeting made from 100% PET fibers when they constructed a warehouse in North Carolina several years ago. During a recent renovation, the purchasing department sought recycled carpet, but not finding any that was price competitive, they purchased carpet made from virgin fibers. The quality of the old carpeting made from recycled fibers seems to be comparable to virgin carpet, and it has shown no signs of excessive ware or discoloration. The purchasing department will seek recycled carpeting in future renovations, but only if it is price competitive.

Florida

The Florida Division of Purchasing has not found a carpeting with fibers made from recycled material that meets their quality specifications. The carpet tested failed the Fade to Light component of their Accelerated Aging Test, which exposes carpet to UV and other light sources. Currently Florida is not purchasing carpet made from recycled materials, but they will continue searching for recycled carpet that is "as good as" carpet made with virgin materials.

Prognosis

Price and quality are the two main issues concerning recycled carpeting. One of the manufacturers contacted said that producing recycled carpeting is less expensive than producing virgin carpet, and claimed their prices are lower than those for virgin carpet. New York and The Body Shop, however, found recycled carpet to be more expensive than virgin. In the area of quality, there were also conflicting opinions. While New York and Florida reported that the recycled carpet faded more quickly than traditional carpet, New Mexico has not noticed fading in their recycled carpeting, and Image Industries claim that their carpet is more stain and light resistant than virgin nylon carpet.

Because the quality of recycled carpet does not appear to be uniform, some care should be taken when choosing a recycled carpet. As there are a number of manufacturers who produce recycled carpet, it is likely that a recycled carpet exists that is both high quality and competitively priced.

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COMPOST

Composting is a form of recycling where organic material undergoes bacterial decomposition under controlled conditions, creating a material which is rich in nutrients and possesses beneficial soil amendment properties. The most significant environmental benefit of compost is that it reduces the utilization of farmland/topsoil and peat, and that it can replace organic matter in depleted or stripped soil. As a soil amendment, it is extremely valuable for erosion control and moisture retention in soil. Composting also reduces the flow of organic material into the waste stream.

A mixture of compost and subsoil is used to produce high quality loam which can be used for all horticultural applications in place of, or in addition to topsoil. Compost-amended soil enhances germination rates and plant growth because it supplies nutrients, retains moisture, and improves soil structure. Compost is recommended for areas where there exist conditions adverse to seed germination and plant growth, such as on poor or sandy soils and on steep slopes. (Massachusetts DEP Composting Program) The cost of a compost/subsoil mixture depends on the amount of each input and the desired consistency, but the mixture can be cost competitive with topsoil.

The Coalition of North East Governors (CONEG) is working to develop guidelines for source separated compost, which are compost mixtures from separated materials such as yard trimmings and wood waste. As there are no national composting standards to date, CONEG is in the process of developing specifications for leaf and yard trimmings compost. With these specifications, CONEG will then set up procurement guidelines for state use. The U.S. Solid Waste Composting Council is also in the process of developing standards for compost which will provide guidelines on compost pH, organic content, stability and maturity.

Composted yard waste has been used in Massachusetts by the Highway Department. The Highway Department does not directly purchase compost, but they have specified the use of leaf and yard material compost in bids, thus requiring contractors to use it. Compost has also been used by communities for local projects, and although municipalities do not widely purchase compost, they do sometimes purchase it for large projects such as landfill closures.

Two states responding to the Commonwealth's survey reported the use of composted material. Oregon terminated its compost procurement program and produces all compost materials in state facilities, and Georgia is in the early stages of establishing guidelines for a procurement program. We also contacted the Florida Department of Agriculture which purchases compost and is currently writing specifications for composted material. CONEG reported that Maine, New Hampshire, Washington, California and New York have compost procurement programs.

Information gathered about the Georgia and Florida programs follows.

Georgia

Georgia is in the initial stages of a program for purchasing composted materials. Legislation passed in 1993 states that state agencies "should" give preference to organic, recycled materials when purchasing agricultural goods, as well as giving preference to materials originating in Georgia that would otherwise go into the waste stream. The Department of Agriculture developed specifications for agriculture goods and the Purchasing Department is just beginning to work on the details of a compost program.

Vendors of recycled compost material are not numerous in Georgia, and the materials that they provide are often not packaged conveniently like traditional agricultural materials: compost does not usually come in bags, but in piles that must be loaded onto a truck. Because of the diverse nature of agricultural material in Georgia, one issue of environmental concern is the use of agricultural material in one region that was generated in another. The purchasing department is considering breaking the state into clearly defined districts between which composted material cannot cross. They will also begin working with vendors to more conveniently package their products.

Florida

The Florida Department of Agriculture is in the process of writing specifications for composting materials and is currently purchasing compost for seeding projects along highways, as a soil amendment, and to hold moisture in the soil (which is especially important in Florida). Florida employs compost for its nutrients and as a way to reduce the amount of organic material entering the waste stream.

Prognosis

Compost can provide essential nutrients to overused and stripped soil, and when mixed with subsoil, it can replace loam or topsoil. The use of composted yard trimmings provides several environmental benefits, among these, replacement of organic matter in depleted soil, erosion control, and reduction of inputs into the solid waste stream. In the past, the Massachusetts Highway Department has required contractors to use compost for certain projects, and any agency involved in landscaping, such as highway, transportation and waste management departments, could use compost amended soils extensively.

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DE-ICERS AND ANTI-SKID AGENTS

De-icers and anti-skid agents are essential for maintaining road trafficability and safety in regions with heavy snowfall, and are used in great quantities in these areas. The predominant materials used to de-ice roads are deep mine road salt (primarily NaCl), industrial premixes usually consisting of NaCl and $CaCl_2$, and Calcium Magnesium Acetate, or CMA. Sand, while not a de-icer, is also used in large amounts as a traction aid. As each material has its own set of health and environmental impacts, as well as price and performance characteristics, cost/benefit comparisons between them have proven to be difficult to make.

The major impacts of the salt mixtures include increased sodium and chloride levels in ground and surface water, toxicological effects on salt-sensitive flora and fauna, increased incidence of animal-vehicle collisions (due to animals licking the pavement to supplement their salt intake), and rusting in automobiles and steel structures such as bridges.

Further research is needed to assess the full impacts of CMA on the environment and on human health. In general, however, it appears that CMA is much less toxic to plants, wildlife, and humans than salt. Possible adverse impacts may include dissolved oxygen depletion in water bodies and mobilization of trace metals in soil.

Road salt is the most commonly used de-icer because of its relatively low cost and the fact that road crews have more expertise applying salt compared to other mixtures. Industrial premixes are more effective than plain salt in lower temperatures, and are used when the pavement temperature drops below 20 degrees Fahrenheit. Finally, CMA is used in environmentally sensitive areas, where salt can have serious adverse effects on the ecosystems bordering on the roadways. Cost, however, is a major constraining factor when using CMA. Whereas salt sells for approximately $30/ton, CMA sells for around $750/ton. Sand, which can be purchased for $7/ton, is used in large quantities as a traction aid, but does not have any de-icing characteristics in and of itself. An additional disadvantage to sand is that significant cleanup costs are incurred after its application.

Prognosis

For the near future at least, there does not appear to be any cost effective alternatives to road salt that are preferable in environmental terms. Rather than replacing road salt on a large scale with alternatives such as CMA, which is still too expensive, the most cost effective method of mitigating the environmental effects of salt-based de-icers is to apply them in a careful and prudent manner. Some new road salt products include anti-corrosion additives which may reduce the impact of salt on steel and iron in automobiles and bridges.

Sources:

Jim Barrett, Normandeau Engineers 603-472-5191, 1995. Personal Communication with H. Wang, June 14, 1995.

MA Highway Department, 1995. Personal Communication with H. Wang, June 14, 1995.

MA DPW Snow and Ice Control Program, 1989. Generic Environmental Impact Report (Draft), March 1989.

ENERGY EFFICIENT COMPUTER HARDWARE

Energy efficiency and recyclability of parts are perhaps the most important environmental issues associated with computer hardware. There are a number of programs and organizations which have developed standards for the purchasing of environmentally preferable computers and components. Probably the best known of these is U.S. EPA's Energy Star Computers Program, which works with computer, monitor, and printer manufacturers to produce energy efficient computer equipment. Other organizations, such as Blue Angel and the United Nations Development Programme (UNDP), have standards for noise, radiation, and ozone emissions, recycled content and recyclability, as well as energy efficiency (for which, it should be noted, they usually refer to the Energy Star standard). The remainder of this section focuses on Energy Star because it is the most developed of the programs, and has easily attainable standards.

Equipment that qualifies for the Energy Star logo can go into a low power "sleep" mode when not in use, and can "awaken" with a touch of the keyboard or mouse. In sleep mode, an Energy Star computer or monitor draws 30 watts or less, and a sleeping Energy Star printer draws from 30 to 45 watts, depending on printing speed. According to EPA, a single Energy Star computer and monitor can save from $7 to $52 annually in electricity bills. The ability to power down when not in use may also significantly extend the life of an Energy Star machine to as much as twice as long as that of a non-Energy Star machine.

As of May 1, 1995, the following local and state governments had signed agreements with EPA to purchase Energy Star equipment wherever possible: the states of Connecticut and Ohio, and the cities of Claremont, Ontario, and San Bernardino. EPA expects the number of purchaser participants to expand quickly as Energy Star begins its outreach program in the summer of 1995.

Prognosis

Designing a procurement policy that complies with Energy Star standards should be a reasonably easy task. According to EPA, Energy Star computers account for over 75% of all domestic desktop computer sales, and 90% of all domestic printer sales. In general, there should be little or no price or performance differential between otherwise similar Energy Star and non-Energy Star computers. However, because the very newest machines on the market have increased power needs, initially there may be some time lag before Energy Star models become available.

Sources:

U.S. EPA, 1993-1995. Energy Star Computers Program promotional literature.

LESS AND NON-TOXIC CLEANING PRODUCTS

Efforts to reduce toxic materials in cleaning products have evolved from a focus on human health effects to also include environmental concerns. As cleaners commonly contain materials that are harmful to both human health and the environment, using products with less or non-toxic and biodegradable ingredients is safer for workers and reduces water and air pollution. However, purchasing environmentally preferable cleaners presents serious challenges because there are no universally accepted definitions of "non-toxic" or "biodegradable."

Cleaners contain five general types of ingredients, all of which can be toxic, hazardous or non-biodegradable. The **surfactant**, or surface active ingredient, is the wetting and foaming agent which is present in most cleaners; **builders** improve the performance of the surfactants; **solvents** dissolve dirt and grease; **antimicrobials** are pesticides which kill bacteria; and a **miscellaneous** category includes fragrances, dyes and thickeners which are often added for marketing reasons. (Green Seal) According to Santa Monica County, cleaning solvents are typically the most toxic of the five categories.

Because a universally accepted definition for non-toxic cleaner ingredients does not exist, purchasers have found a variety of ways to select products that they consider to be non-toxic. Most purchasers require that vendors supply Material Safety Data Sheets (MSDS) for their products. These documents outline the hazardous materials contained in the products. The General Services Administration (GSA) requires that products submitted for bid meet EPA specifications for oral and inhalation toxicity. The Massachusetts Port Authority (Massport) requires that products contain no ingredients on EPA's 33/50 list (See Appendix A), and the City of Santa Monica prohibits any materials in their products that are listed in SARA (Superfund Amendments and Reauthorization Act), Section 313.

Determining the meaning of "biodegradable" also can be difficult, due to the lack of a clear legal definition. EPA and GSA use the OECD definition of "readily biodegradable," which states that 70% of the product in question must biodegrade within 30 days. Test methods for biodegradability are outlined in the Code of Federal Regulations (CFR) 40, Subpart D, 796.3100-3400.

According to various organizations that responded to the Commonwealth's survey, the response to less or non-toxic and biodegradable cleaning products has been mixed. Satisfaction with the cleaners very much depends on user expectations and the importance placed on lessening impacts to the environment.

Among those organizations and agencies that answered the survey, the city of Santa Monica, Tennessee, The Body Shop and Rocky Mountain Institute reported a program for purchasing less and non-toxic and/or biodegradable cleaning supplies. In addition to these organizations, we contacted the Paint and Chemicals Commodity Center of the General Services Administration, the Massachusetts Department of Corrections, and Massport to learn about their purchasing program and utilization of less and non-toxic cleaners.

In the paragraphs that follow, we present data gathered about the experiences of organizations regarding the purchasing of less or non-toxic and biodegradable cleaning products.

Santa Monica, CA

The city of Santa Monica has an extensive program for toxic use reduction which covers all custodial cleaning products and city programs. They have developed a detailed group of cleaning supply specifications for potential vendors, including pass/fail criteria (e.g., products cannot contain carcinogens, mutagens, teratogens, chlorinated fluorocarbons, or chemical ingredients listed in SARA, Section 313), and a number of sliding scale criteria. The sliding scale scores products with respect to how closely a product meets pre-defined "ideal" criteria (e.g., products shipped in concentrate form, or a flash point greater than 200 degrees F). The lower the score, the closer to the ideal a particular product is. Santa Monica selects products on the basis of their scores and the cleaning effectiveness of test samples.

The city attempts to exclude all hazardous materials from their products, but there have been cases where a product was used with a hazardous but also highly biodegradable ingredient. An example of this is a chemical solvent called di-limonene which is made from orange peels. In concentrated form it has a high aquatic toxicity, but it biodegrades almost immediately. Santa Monica chose to use this solvent with the presumption that its toxicity would dissipate before entering the environment.

After a one year pilot program, the city realized a savings of 4% for cleaning supplies and enjoyed a marked improvement in worker morale without any loss in cleaning performance by the alternative cleaning products. The savings were largely attributed to the utilization of concentrated products (it is less expensive to get water on location than to ship it). The janitorial staff who tested the supplies were apparently pleased to be given the job of testing potential products and appreciated having their opinions heard. Over ten months of using new products, the City discovered that the majority of them performed as well, if not better, than those products they replaced.

Tennessee

The Tennessee Department of General Services (DGS) reports that their program for purchasing non-toxic cleaning products began in 1989 when the Corrections and Mental Health Agencies requested these products for safety reasons. The purchase of non-toxic products (undefined in material provided) is not required but products have been placed on the state contract along with traditional cleaners. Five vendors produce 20 cleaning products for DGS, and DGS no longer has any difficulty obtaining a supply of these products.

The state has no lab to test products, so they rely on the vendors' MSDSs to determine if products are in fact non-toxic. Samples of the non-toxic products are sent to agencies for performance testing.

Most of the products have a minimum order amount so while the majority of large state purchases are for non-toxic products, an agency needing a few units of a product might go to a local vendor and purchase a product that is not non-toxic.

GSA, Paint and Chemicals Commodity Area

GSA's Non-Hazardous Purchasing Program was set up to reduce use of toxic materials among GSA's customers, and has been actively purchasing non-toxic and biodegradable products for government agencies for the past two and a half years. As part of their mission, they actively seek biodegradable and non-toxic cleaners to replace traditional cleaners. The percentage of non-toxic cleaners purchased is not known, but they are in the majority.

GSA has purchasing standards for biodegradability and non-toxicity and evidence for both must be submitted in the bid process. Products offered by vendors must be "readily biodegradable" as defined by OECD and determined through the "Modified OECD Screening Test" (40 CFR 796.3240). In addition, qualifying products cannot meet any of the criteria in 40 CFR 261.11(a)(2) which would result in a designation as toxic waste. Bidders must provide evidence for their products that the oral LD 50 toxicity (rat) is greater than 50 mg/kg, that the inhalation LC 50 toxicity (rat) is greater than 2 mg/liter, and that the dermal LD 50 toxicity (rabbit) is greater than 200 mg/kg.

The general reaction to the substituted products appears to be that while they perform fairly well, they are not always direct substitutes. Non-toxic cleaners for ship machinery was cited as an example of a cleaner that is quite different than the original product. While the non-toxic substitute is reasonably effective, it is more flammable than the original. Because reducing the use of hazardous materials is considered important, the non-hazardous cleaning agents are highly desired among federal agencies.

Massachusetts Department of Corrections

The Department of Corrections researches and produces cleaning materials that are considered non-toxic at the MCI facility in Norfolk. Products produced are considered non-toxic, and although they do contain minimal toxic chemicals, they should not be harmful if used properly, according to a shop chemist. The chemicals used in their seven products are accompanied by MSDSs and each chemical is rated for its toxicity on a scale from 0 to 4, 0 indicating no health hazard. MCI Norfolk uses only chemicals rated 0 or 1. They do not produce anything that requires EPA certification and none of the products are labeled as biodegradable. In purchasing less-toxic chemicals for their cleaners, the only difficulty at the present time is finding a substitute for phosphoric acid, a common component of toilet bowl cleaners.

The cleaning shop sells 90% of their products to the Department of Corrections and the remaining to other state facilities. The Department must purchase cleaners from outside vendors that are not produced at the shop, and according to the shop chemist, the department has had some difficulty finding non-toxic versions of necessary cleaners.

Massachusetts Port Authority (Massport)

Massport is currently working on a Toxic Use Reduction program, mostly for cleaning materials. Relying predominantly on EPA's 33-50 list of toxic chemicals as a guide, Massport is in the process of replacing products which contain any of these chemicals. Vendors are also beginning to offer cleaning products without any chemicals from the 33-50 list. Like Santa Monica, Massport has included workers in the process by allowing them to test the substitute products. The program has been considered a success so far not only because it is eliminating toxic chemicals, but it is also improving worker morale by involving the people using the products.

The Body Shop, Inc.

The Body Shop requires vendors to provide Material Safety Data Sheets for their products, which are considered reliable sources of information about the chemicals in the products. While readily acknowledging that non-hazardous substitutes for traditional cleaning products exist, the Body Shop reports that finding substitutes that are not overly expensive can be challenging. The Body Shop is willing to pay more for non-hazardous materials, but they seek products that are competitively priced.

Prognosis

The general consensus among those contacted is that while not always perfect substitutes, non-toxic and non-hazardous cleaning supplies can do the job well while offering significant environmental and safety benefits. Establishing non-toxic and biodegradable standards and researching vendors with products that meet these standards can be extremely time consuming, but are both very important parts of the process. Testing the performance of the products selected is a good way to involve those who will be using them.

Sources:

Washington Toxics Coalition, 206 632-1545; Fact Sheet

Green Seal, Proposed Standards for General Purpose Household Cleaners, August 1992.

Shaklee Corporation, 415 954-3000; Information Sheet

40 CFR part 423, Appendix A. Priority Products.

40 CFR part 261.11 (a)(2), criteria for listing hazardous waste; 40 CFR 796.3240, definition of readily biodegradable.

Conversation with Geoff Lamdin of the Lamdin Group, distributor of Shaklee Products, 802 295-4993

NON-CHLORINE BLEACHED PRINTING/WRITING PAPER AND UNBLEACHED OR NON-CHLORINE BLEACHED TISSUE PAPER

The use of chlorine in the bleaching of wood pulp for paper production can lead to the generation of dioxins and other chlorinated organics. Certain chlorinated organics are considered to be highly toxic to animals, and may cause malignancies, birth defects, and physical deterioration even at very low doses. Although research is still inconclusive regarding the effects of dioxins on human health, EPA has classified one particular dioxin isomer, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), as a "probable human carcinogen." Studies have shown that many bleached kraft pulp mills release dioxins at detectable levels into streams and rivers.

Chlorine-free alternatives for paper bleaching can offer significant benefits by reducing or even eliminating chlorine releases into the environment associated with paper production. The term "chlorine-free," however, does not always mean that no chlorine was used during the bleaching process. Chlorine-free bleaching technologies can be divided into a hierarchy of preferability determined by the amount of chlorine released into the environment through the manufacturing process.

In the hierarchy, the best way to avoid chlorine releases and other environmental problems associated with bleaching is to not bleach the paper at all. **Unbleached** paper is often used in applications such as tissue paper and brown paper towels. For paper that requires whitening, the most environmentally preferable bleaching processes are those which avoid the use of molecular chlorine (Cl_2) and all of its derivatives. These processes are called **Total Chlorine Free (TCF)**. A new term that has recently come into use is **Processed Chlorine Free**, which according to the Chlorine Free Products Association, refers to paper that contains TCF virgin fiber and recycled content that is not rebleached with any chlorine containing compound. Some of the recycled content, however, may have been originally bleached with chlorine or chlorine compounds. Chemicals used to bleach TCF paper include hydrogen peroxide, ozone, and/or oxygen. A step down from TCF is Molecular, or **Elemental Chlorine Free** (MCF, ECF). ECF refers to paper bleached only without the use of molecular chlorine (Cl_2), and does not exclude paper bleached with chemicals such as sodium hypochlorite and chlorine dioxide. These chemicals are somewhat less reactive than molecular chlorine, resulting in a reduction in organochlorine pollution. However, the use of chlorine derivatives does not solve the dioxin release problem completely, and still results in pollution.

There is very little purchasing information on non-chlorine bleached *printing and writing* (P&W) paper, due to the fact that there is very little purchasing of this type of product. One labeling program in our database, Blue Angel, has a standard for non-chlorine bleached P&W paper. Only one respondent from our database, the Body Shop, purchases non-chlorine bleached P&W paper. Both the State of New York and King County WA are examining the possibilities of purchasing non-chlorine bleached paper products, but are still in the information gathering stages. King County published their 1994 Annual Report on Recycled Product Procurement on James River Eureka 100!, a non-chlorine bleached, sheet with 60% p/c content, but have not used non-chlorine bleached paper on a large scale. An interesting exception to the overall hesitancy of agencies toward non-chlorine bleached P&W paper is the case of EPA Region 10, which recently switched its offices over to James River Eureka 100!. It appears that for the most part, however, agencies are taking a conservative stance with respect to non-chlorine bleached P&W paper.

A number of vendors supplying non-chlorine bleached paper do exist, however. These include James River, Hammerhill, Simpson, Crosspointe, and Domtar.

On the other hand, *tissue paper* not bleached with chlorine appears to be very popular in certain applications such as food service and in educational institutions. Although we were unable to locate any state purchasers who were knowledgeable about purchasing non-chlorine bleached paper products, Wisconsin Tissue reports that sales of their line of 100% p/c content, *unbleached* paper products are expanding rapidly. According to Wisconsin Tissue, customers are very satisfied with the performance of the papers, which are priced competitively with the equivalent chlorine-bleached products.

It is interesting to note that Florida maintains two grade standards (A and B) for tissue paper products, the difference between the two laying solely in the brightness criterion. Grade A must have a brightness level of 60%, whereas Grade B has no such standard. This suggests that the brightness of even tissue products still plays a role in people's purchasing decisions about paper.

Prognosis

Because of the controversy that surrounds dioxin releases and the use of chlorine, most states and organizations have not yet developed policies toward chlorine-free bleached paper. Some of the more proactive state and county governments, such as King County WA, have looked into the problem and taken a tentative step or two but are waiting for guidance from standard setters such as the U.S. EPA. Other state and local governments, such as the City of Seattle and the City of Chicago have policies that encourage the use of non-chlorine bleached paper. It is unclear, however, the extent to which these policies actually result in the purchase of non-chlorine bleached paper.

However, because the evidence suggests that chlorine at least poses a *risk*, it may be wise to take the "better safe than sorry" approach to purchasing paper products. All other factors being comparable (including cost, performance, etc.), purchasing paper products that are unbleached or not bleached with chlorine is the preferable policy. This is especially true for products whose functionality is not affected by the brightness of the paper, such as towels and coffee filters.

Sources:

Johnson, Jeff, Wisconsin Tissue, 1995. Personal Communication with H. Wang, 6-12-95.

Natural Resources Defense Council, 1993. “Petition to Prohibit the Discharge of 2,3,7,8-Tetrachlorodibenzo-P-Dioxin by Pulp and Paper Mills.”

U.S. EPA, 1990. “Summary of Technologies for the Control and Reduction of Chlorinated Organics from the Bleached Chemical Pulping Subcategories of the Pulp and Paper Industry”, April 27, 1990.

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ORGANIC FOOD

Organic foods are grown with a limited application of pesticides and fertilizers, making them environmental preferable to conventionally grown foods because fewer chemicals enter the environment. A nationally accepted, common standard for organic foods does not exist, but according to the Massachusetts chapter of the Northeast Organic Farmers Associations (NOFA), standards are fairly similar from state to state, and virtually identical among New England states. NOFA standards, followed by organic farms in New England, are considered some of the more stringent standards in the country.

NOFA requires that to qualify for organic certification, the land on which the crops are grown must be free of prohibited pest controls for at least three years and free of prohibited fertilizers for at least one year before planting. NOFA standards list substances and practices allowed, regulated, and prohibited. There is general agreement that **allowed** practices belong in an organic management program, and that the use of substances and practices listed under **regulated** should be limited. The use of **prohibited** substances and practices can disqualify a farm from certification.

The environmental benefits of organic foods are substantial, but their prices can be high. Organic foods are customarily grown on small farms, and can cost from 25 to 100% more than conventionally grown foods, farmed on a larger scale. According to a user of organic food whom we contacted, its price was the main deterrent to its wide scale use.

None of the respondents to Abt Associates' survey reported purchasing organic food. According to distributors of organic food, the most recognized and advanced cafeteria style purchaser of organic food in the Boston area is Tufts University Dining Services (Medford, MA), whom we contacted. We also contacted JP Foods, the purchaser of food for Massachusetts' state agencies.

A brief description of the Tufts program and the status of organic food purchasing in MA follows.

Tufts Dining Services

Tufts is in the preliminary stages of organizing an organic food program. The initiative began during the past year when Tufts began stocking the cafeteria salad bars with organic carrots and mushrooms. These items were chosen because they are not seasonal and are usually in plentiful supply; the farms from which they are harvested follow NOFA standards. As they expand their organic food program, Tufts Dining Services' purchasers will look into locally grown organic apples. They have found that carrots and mushrooms are readily available in the area but that their prices are significantly higher (40-100%) than prices for non-organic substitutes.

The organic food initiative is part of the Tufts Food Awareness Program which is a small part of the University's Environmental Stewardship Program. Graduate students studying nutrition worked with Dining Services to research organic food and provide information to consumers about the organic foods. The reaction from consumers has been very positive.

Dining Services is in the process of reorganizing its five kitchens so each will receive food from a central purchaser. By giving more purchasing power to the head of Dining Services, it will be possible to purchase organic foods on a larger scale.

JP Foods

JP Foods is a distributor of foods, largely to industries and businesses, and they purchase most of the food for Massachusetts' state agencies. According to JP Foods' Special Projects Manager, no state agencies have requested that their food purchases be organic, but some request natural products such as nature burgers, which may be organic. JP Foods' clients who wish to purchase organic food usually go to more specialized dealers.

JP Foods has found that the prices for organic foods are about 25% higher than prices for conventional foods, and the price of organic lettuce is as much as double the price of non-organic lettuce.

Prognosis

The purchase of organic foods results in an environmental benefit and some consumers find that organic foods have a superior taste compared to conventionally grown foods. The main deterrent to the purchase of organic food is its price, which is usually significantly higher than the price of non-organic food.

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PRINTING/WRITING PAPER WITH POST CONSUMER RECYCLED CONTENT 20% OR GREATER

Recycled paper plays an important role in mitigating environmental impacts by diverting waste from the solid waste stream, reducing energy use, and preserving trees. Agencies purchasing paper products containing post consumer (p/c) recycled content help to close the recycling loop by increasing demand for recycled products.

A fair amount of attention has been paid recently to the issue of recycled paper with the publication in March 1995 of EPA's proposed Federal Procurement Guidelines for recycled paper products. With these guidelines, EPA has defined recommended recovered fiber content levels for many grades of paper, including printing and writing (P&W) paper. For "reprographic" paper, EPA's recommended recovered fiber content level is 20% total recovered fiber and 20% post consumer fiber. For "cotton fiber" paper, EPA's recommendation is 50% total recovered fiber and 20% post consumer fiber.

From speaking with some of the surveyed states and counties, it is clear that there exists a wide range of purchasing policies when it comes to recycled content in printing and writing (P&W) paper. Some of the most proactive state and county governmental agencies, such as the King County Purchasing Agency and the Minnesota State Printing Office, are now purchasing and using 20%, 25%, and even 35% post consumer content P&W paper on a regular basis. Other states, on the other hand, are still mostly purchasing virgin printing and writing paper, even when they have state contracts for buying recycled paper in place. Overall, it appears that only a relatively small amount of 20% p/c content printing and writing paper is being purchased, and that only a small number of organizations and agencies are purchasing that grade of paper. Of those agencies purchasing paper with a high p/c content (20% or higher), most seem to be enthusiastic about it, and report good performance results of the paper in copier and printers.

The price of a sheet varies with the amount of post consumer content in the sheet, the quantity purchased, and the current supply situation. In general, there appears to be a price premium ranging from 0% to approximately 10% when purchasing recycled over virgin, and price differences appear to be decreasing. For example, Missouri is preparing to eliminate its 10% price preference for recycled paper in August 1995 because of price parity between virgin and 10% p/c content copy paper. In some cases, paper with 20% p/c content is still slightly more expensive than 10% p/c content, but New York State, a large paper purchaser, reported little to no price differential between the 10% and 20% grades. Massachusetts recently awarded a contract for computer papers that set the price for 20% p/c paper at 3.04% higher than the comparable virgin sheet, with 50/10 (50% total recovered material/10% post consumer content) paper prices ranging from 0% to 10% over virgin. When purchasing paper with post consumer content above 20%, however, prices can rise quickly. King County WA, whose 25% and 35% p/c content copy paper purchases account for around 90% of their total paper purchases, pays up to 25% more for these papers than it does for 50/10 paper.

The current tight supply of paper may contribute to some temporary high prices and availability problems for recycled sheets. According to several sources, the recent economic upturn has resulted in increased demand for coated sheets, leading to expanded production at the expense of uncoated, recycled sheets.

In the paragraphs that follow, we provide further data for the states we contacted to discuss the issues involved in purchasing printing and writing paper with 20% or more p/c content.

Minnesota

Minnesota Statute 16B.122 (1992) requires that state printing jobs be printed on paper with at least 10% post consumer recycled content whenever "practicable." Thirty four percent (34%) of all copy paper purchased by the state is 50/20 Badger Envirographic, with the remaining consisting of virgin copy paper. This price of this recycled sheet is currently more than 10% more expensive than virgin, but the Minnesota Central Stores sells this paper to agencies at a 10% or less price premium, in order to encourage the use of recycled paper. Starting July 1996, a new statute will go into effect that specifies the purchase of copy paper with 20% post consumer content. There is also a state statute (115A.56, 1992) that requires post consumer content disclosure whenever the paper is called "recycled." The occasional ream of recycled paper is returned due to difficulties with copiers. Minnesota is a participant in a joint paper contract with eight other states, including Wisconsin, Illinois, Indiana, South Dakota, Ohio, Pennsylvania, New York, Michigan, as well as University of MN.

We also spoke with the Minnesota State Printing Office, which is very proactive in the areas of researching and implementing environmental printing practices. Currently, approximately 70-80% of its paper purchases are recycled, with the balance of purchases being for the occasional coated, unrecycled sheet. All in-house paper is at least 20% post consumer, and they have been experimenting with 25% p/c sheet.

New York

New York has no legal requirement for recycled paper to be used in state printing jobs. The Purchasing Office, however, has its own specifications for paper. For both contracted jobs and in-house printing, the use of 50/10 or 50/20 paper is encouraged. Out of a total $22,700,000 spent in 1994 on in-house printing and writing paper, $7,400,000 was for recycled sheets. State-wide, recycled paper gets a 10% price preference, or a 15% price preference if up to 50% of the post consumer waste was generated in New York State. There is about a 10% price differential between recycled and virgin, with little to no price difference between the 50/10 and 50/20. Vendors are offered 3 month contracts, which was recently shortened from 6 months. The recycled product performs well, although there is still occasional resistance from printers.

Approximately 75% of all NY state printing jobs are sent out to contractors. For these jobs, there is a recycled content specification, but only the cost of the finished products are considered in the bid process.

King County, WA

King County has implemented the King County Recycled Product Procurement Policy, which strongly encourages the use of recycled products, including paper. King County's specification for printing and writing paper is 50% total recycled content or 25% p/c content. For county agencies, a 50/10 paper is also available. In 1994, 97% of printing and writing paper purchased for King County was recycled paper. Currently, printing and writing paper is broken down into three rough categories: approximately 45% of printing and writing paper is purchased in the form of a 25% p/c content sheet made by Weyerhaeuser; 45% is a James River paper called Eureka Premium which has 35% p/c content; and most of the remaining 10% is a 50/10 paper. The 25% and 35% p/c content papers cost about 25% more than the 50/10, mostly due to low production volume of these papers.

King County goes through many vendors to supply its paper needs, because in general it is difficult to find one vendor with all of the right kinds of paper. The recycled paper appears to meet the performance needs of most of the County's users. Some still, however, insist on the 50/10 paper, although the King County Purchasing Agency believes that the resistance is more of a perception issue than a performance one.

There is also a paper called James River Eureka 100!, which is 100% recycled, 60% p/c content, and non-chlorine bleached paper. King County used it for their Annual Report, but does not buy it in great quantity because its price is significantly higher than other papers. According to the King County Purchasing Agency, EPA Region 10 has made a decision to switch over to Eureka 100! despite its cost. The 15% price preference that King County has in place for recycled paper is used only when there is an open invitation to bid. The price preference is often not employed when they know exactly the product they want to purchase, with the County preferring instead to pay the market price for that product.

Louisiana

Louisiana has solid waste legislation that encourages recycling, but there is no legal requirement to purchase recycled paper. Louisiana's Office of State Purchasing follows EPA guidelines with respect to recycled content, and purchases 50/10 paper for copiers. Annual purchases of all paper are approximately $5,000,000, of which 20-25% is recycled and about two-thirds is printing and writing paper. Of the printing and writing paper, only about 5-10% is recycled, the remaining being virgin. Louisiana uses around 6 vendors for their paper purchasing. There is a small (maybe 5%) price differential between virgin and 50/10. There have been no reported complaints among those who use the recycled paper. Louisiana plans to raise recycled content of the recycled paper to 50/20 sometime this year.

Prognosis

While there may still be a small price premium, incorporating the purchase of printing and writing paper with 20% post consumer recycled content into a state procurement policy should be reasonably straightforward.

RE-REFINED MOTOR OIL

Re-refined oil is used motor oil that has undergone a cleaning process to remove contaminants and replace the appropriate performance additives. Because lubricating oil does not wear out, re-refined oil is equivalent to virgin oil in every respect, except that new inputs of crude are not required in its manufacture. Motor oil referred to as “re-refined” is often a blend of virgin oil and re-refined basestock, with the percentage of actual re-refined oil usually ranging from 50 to 100 percent of the total. In May 1995, the U.S. EPA issued procurement guidelines to expand markets for re-refined lubricating oil, where it specified that oil meeting the guidelines must contain at least 25 percent re-refined oil.

Re-refined oil offers a number of economic and environmental advantages, without sacrificing performance. Studies by the National Bureau of Standards, the U.S. Army, the Department of Energy, and others have concluded that re-refined oils perform as well and sometimes even better than virgin oils. The environmental benefits of re-refined oil include reducing the input of used oil into the environment, as well as conserving resources. In addition, for most regions of the country, there is no significant price difference between virgin and re-refined oils, and in some cases, re-refined oil is less expensive than virgin. (U.S. EPA, 1994)

There are an increasing number of state and local governments for which re-refined oil makes up the great majority of their motor oil purchases for their motor pools and fleets. King County WA, and the states of Oregon, New York, and Kentucky are examples of governments which fall into this category. In many cases, the use of re-refined oils was initially required by a recycling or resource conservation law.

Although many of these governments met with some initial resistance during the switch to re-refined oil, most have overcome these difficulties and now receive very few complaints about the use of re-refined oil. Initial common difficulties included the perception that re-refined oil would either damage the vehicle engines, void engine warranties, or both. These problems turned out largely to be perception rather than performance issues. Re-refined oil purchased by states, counties, and cities is almost universally required to meet American Petroleum Institute (API) quality standards, which is usually the critical factor in preserving warranty eligibility. According to EPA, the General Services Administration (GSA) has issued a policy directive approving the use of re-refined oil in Federal agency passenger cars and light-duty trucks. In December of 1994, GSA obtained assurances from car manufacturers that automobile warranties would be honored as long as the re-refined oil carries the API "starburst" seal of approval.

A possible problem in developing a program which purchases re-refined oil exclusively may be the unavailability of certain grades of oil. In addition, there may be some initial user resistance to the new products, which can be overcome through education and training.

In the paragraphs below, we present data gathered from some of the survey respondents who have some experience with re-refined oil.

Oregon

The state of Oregon has been purchasing re-refined oil for four years in statewide contracts, but re-refined oil has been procured at the agency level (Dept. of Forestry, Transportation, etc.) for an even longer length of time. The statewide program started after the passage of a state law mandating the use of recycled products wherever possible.

Although exact statistics were not readily available, the great majority of all oil purchased for the State of Oregon is re-refined, and most state vehicles are running on re-refined oil. In cases where the required grade is not available as a re-refined oil, the state purchases virgin oil. Our contact understands the re-refined oil purchased to be 100% re-refined basestock, with no virgin stock.

Originally costing about one cent per quart more than virgin oil, re-refined oil is now less expensive for some formulations. For example, virgin 10W-30 oil costs approximately $3.05/gallon, whereas re-refined oil costs $2.90/gallon. Oregon also has started a program in which oil is purchased in bulk and distributed in reusable quart containers. This practice has the added benefit of reducing container costs and solid waste.

There have been no performance difficulties, and users have been very receptive for the most part. Some educational seminars and "coffeehouses" were undertaken to train personnel about advantages of and use of re-refined oil. The current contract is a three to five year contract with Chevron, who supplies 100% of Oregon's re-refined oil. All oil purchased must meet quality standards which preserve warranties on engines.

King County, WA

King County has been purchasing re-refined oil for the past two and a half years. The current specification is that where possible, motor oil should contain a minimum of 25% re-refined basestock. Actual practice, however, has found that the re-refined content is usually somewhere between 50% and 100%. For their new contract this summer, King County is raising the minimum content to 50%. All of their 30-weight, 10W-30, and 15W-40 is purchased as re-refined oil. They allow a 10% price preference for re-refined oil. The actual premium is somewhere between 5 and 10 percent.

Re-refined oil is used in almost every vehicle in the County fleet, including motor pools, trucks, and passenger cars. Although performance has been good, it has been a difficult process for King County to sell the idea of re-refined oil to agencies and fleet managers, who often remember the first unsuccessful attempts to use recycled oil (which was simply strained and put back into the cars). There is a tendency to be quick to blame re-refined oil for engine problems. Although most fleet managers are now using re-refined oil, the King County Purchasing Agency feels that they are doing so mostly because of pressure from the higher management. They have a "well, it hasn't broken down...yet" attitude when it comes to their opinions on re-refined oil. Nevertheless, in 1994, Solid Waste Operations traveled over two million miles in their cars and trucks w/re-refined oil, and the Motor Pool drove nearly thirteen million miles in their fleet.

In early 1996, the Department of Metropolitan Services, which runs the buses and sewers in Seattle, will be merging with the King County Govt. This will probably lead to many more vehicles (namely, buses) using re-refined oil in their engines.

Arizona

Arizona, while having set up a contract to buy re-refined oil, has not purchased any to date because 1) the contract is new and 2) as of April 1995, they had not yet received approval from vehicle manufacturers that using re-refined oil would not void the extended warranties.

New York

Five years ago, the state of New York began to permit companies bidding on the motor oil contract to include re-refined oil, providing the products met API quality standards. At that time, two companies, Superior Lube and Medallion Oil offered re-refined oil, and managed to capture part of the contract. (New York State is divided into eleven zones, and companies bid by zone.)

About two to three years ago, these two companies split the whole contract between them, and at that point, New York State began to buy re-refined oil exclusively. The contract was won without a price preference, although one exists. Currently, there is a ten percent price preference for re-refined products, and a 15% price preference for re-refined oil containing a certain percentage of re-refined basestock originating from New York State. In some of the more remote zones, the price preference is engaged, but for the most part, re-refined oil is less expensive than virgin oil.

The current standard for re-refined oil, as set by the Department of Environmental Conservation, is that motor oil purchased by the state contain at least 50% re-refined basestock. Some of the products purchased, however, contain as much as 100% re-refined basestock.

New York reports that although there was some minor resistance among a small percentage of OGS's customers, users have become accustomed to re-refined oil and seem to be quite satisfied with the product.

Kentucky

Kentucky has a contract in place for purchasing re-refined oil. Originally proposed and approved by the Kentucky Department of Transportation over two years ago, there is a requirement that all motor pool and fleet vehicles be serviced with re-refined motor oil. Most grades are available in re-refined formulation. There is some resistance in Department of Aviation to using re-refined oil, but no complaints in terms of motor vehicles. There appears to be no substantial price differential between virgin and re-refined.

Seattle, WA

When confronted with the question of whether it was wise to use re-refined oil in diesel engines, the City of Seattle "obtained letters from the manufacturers stating that the engines would still be under warranty. Similar letters were obtained from the city of Vancouver, British Columbia, and Snohomish County, Washington, which both had been successfully using re-refined oil." (DOE, 1994)

Prognosis

Being both price and performance competitive with virgin oils, re-refined oils offer an excellent opportunity to significantly further the state's environmental goals at very low additional cost. Because re-refined oils consisting of 100% re-refined basestock are now available, a standard of 25% (EPA's guideline) or even 50% re-refined basestock (the same as New York's and King County's requirement) should be reasonably easy to meet.

Sources:

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RETREADED TIRES

The retreading of tires, in which new treads made from virgin rubber are applied to used tire casings, is considered one of the most environmentally successful recycling campaigns to date. Because the tire casing makes up 75-85% of the materials in a tire, reusing the casing conserves petroleum (the primary ingredient in synthetic rubber) as well as reduces inputs to the solid waste stream. Furthermore, the price of retreaded tires is about one third the price of tires made with 100% virgin materials and they perform as well, if not better, than new tires.

The retreading process involves four main steps. The used casing is first inspected to insure that it is free from manufacturing defects, non-repairable damage and excessive aging. The worn tread is then removed during the buffing process, after which a slightly damaged casing can be repaired. The third step is applying the new tread, and can be done in two ways, using either mold cure or precure techniques. Both involve affixing virgin rubber to the old casing and are considered to produce tires of comparable quality. Curing, or vulcanization, is the final step of bonding the new tread material to the tire body, and transforms the uncured rubber from a soft, tacky substance to a hard tread. (American Retreaders Association)

The oil savings of retreading tires is substantial. A medium sized truck tire weighs 115 pounds and its production requires approximately 22 gallons of oil. Retreading a tire of equal size requires about 23 pounds of virgin rubber and uses only 7 gallons of oil. The American Retreaders Association, an association promoting the use of retreaded tires, estimates that in 1993, the use of retreaded tires in North America saved over 400 million gallons of oil, as well as keeping over 30 million tires out of the scrap heap.

The performance of retreaded tires has be found to be comparable, if not superior, to new tires. Tire strength tests sponsored by the American Retreaders Association have consistently demonstrated that retreads have the same integrity in operation as comparable new tires, and the general consensus among purchasers contacted is that retreaded tires last as long as new tires. Typical over-the-road tires perform for about 20,000 miles, similar to the performance of a retread tire. A quality casing, however can be retreaded two to three times, thus doubling or tripling its life span. “Rubber on the road” is usually blamed on retreaded tires, but the majority of rubber littering highways comes from new but poorly maintained tires, and not retreads. (The Tire Retread Information Bureau, TRIB)

Performance of retreads is largely dependent on the quality of the casings used in the retreading process. Because current technology enables the retreading industry to use computers to examine casings, higher quality retreads can be manufactured. While as many as 85% of passenger tires are rejected in the inspection process, there is a higher acceptance rate for truck tires due to the stronger construction of their casings. Casings are not as likely to be damaged if they are retreaded before the tread gets to the legal minimum depth of 2/32”. (TRIB)

According to a U.S. Conference of Mayors “Buy Recycled” Campaign publication, retreaded tires are not recommended for high-speed chases and emergency applications, but according to the American Retreaders Association, they are used in ambulances and fire trucks. The General Services Administration’s Federal Tire Program issues a list of applications for which retreads are best suited: local delivery vans, logging and other terminal yard trucks, mining

operation vehicles, intra-city passenger cars operating below 55 mph, military vehicles operating below 55 mph, and off-road vehicles where highway operation is less than 30% of total driving time.

The GSA Federal Tire Program cautions against using retreads on front steering axles, especially if the casings were not originally designed for a steering axle. TRIB points out, however, that while not as widespread, many trucking companies are retreading steering tires as well as non-steering ones. TRIB reports that U.P.S., Federal Express and the U.S. Postal Service retread all types of tires, as do many other delivery services.

Retreading passenger tires is not as common as truck tires, primarily for cost reasons. In a five year study, the State of Oregon found that while it is cost effective to purchase high quality casings for trucks and retread them several times, it is more economical to buy less expensive casings for passenger cars and small trucks and to purchase new tires when they wear out.

The Federal Tire Program makes certain recommendations to state and local governments for incorporating retreaded tires and retread services into a procurement program. To ensure quality retreads, they recommend requiring that tires meet the Federal Specification ZZ-T-381Q and that bidders should be certified to the GSA Federal Tire Program (QAFIP). While it has developed standards for retreaded passenger tires, the U.S. Department of Transportation (DOT) has not done so for retreaded truck tires.

Among those organizations and agencies which responded to the Abt Associates' survey, the states of Georgia, Minnesota, Mississippi, Nebraska, New Mexico, New York, Ohio, Oregon, Washington and Wisconsin have active purchasing programs for retreaded tires, mostly for trucks. King County, WA has an active purchasing program as well. In general, purchasers are happy with retreaded tires, largely because they are less expensive than new tires; the environmental benefits of retreads seem to be more of a bonus than a primary reason for their purchase.

In the paragraphs that follow, we provide further data for the agencies we contacted to discuss the viability of purchasing retreaded tires.

Georgia

A Georgia state law which encourages the purchase of products containing recovered materials requires that agencies buy retreaded tires for trucks when replacing non-steering axle tires larger than 16" rim size. The three main motor pools affected by this requirement, the Departments of Transportation, Forestry, and Natural Resources, are satisfied with the quality of retreads and have estimated a 60-75% savings by purchasing retreaded tires rather than new tires.

An initial problem with satisfying the requirement was locating casings suitable for retreading. The initial failings of retreads were mostly blamed on these poor quality casings. Now that a substantial stock of quality casings exists, there have been very few problems with the program.

The law only requires retreads on non-steering axle tires, even though the purchasers have seen no solid evidence that there are problems with retreading front tires. The general belief among tire users is that retreaded front tires might not hold up well because as steering tires, they would experience a higher level of stress. Georgia has not tried outfitting passenger cars with retreads.

New York

New York's Office of General Services (OGS) has a new retreaded tire contract and has had no problem finding vendors. They report that half of New York's tire purchases are of retreaded tires, the majority being for tractor/trailers and garbage trucks. The economic benefits of retreads are the main reason OGS purchases them, especially since they seem to perform as well as new ones. OGS estimates that a high quality casing can be retreaded two or three times, allowing it to perform for 50,000 to 100,000 miles. They keep retreaded tires on back axles while putting new tires on all front steering axles.

Oregon

An Oregon state statute requires state agencies to purchase retreaded tires for most non-steering axle truck tires if the cost per mile differential between retreaded and virgin tires does not exceed five percent. The state has a contract with a single tire vendor who sells new and retreaded tires and provides a retreading service. The entire state tire contract totals over $1 million and the retreaded portion in 1994 was $337,211. Oregon only retreads truck tires.

With one primary vendor, the state finds that it can get retreaded tires with rubber that is more suited for certain purposes. A truck that primarily travels for long distances will be equipped with a retread of hard rubber, while a vehicle traveling in the snowy mountains will have tires made with a softer, more spongy rubber that has better gripping ability.

Wisconsin

Wisconsin has a legal requirement to purchase retreaded tires if they are cost competitive and of comparable quality. Retreads are definitely cost competitive but are generally perceived to be of slightly lower quality. Wisconsin follows specifications from the Federal Highway Program which recommends that retreads not be used on steering axles. This limits their use indirectly because often all four tires are replaced at once and each tire gets replaced with a new one. The state has found that retreaded tire vendors are readily available but not as wide spread throughout the state as new tire vendors.

King County, WA

King County Purchasing has a tire treading service meant to extend the life of tires and used exclusively for truck tires. In 1993 and 1994, a total of $147,024 was spent on retreaded tires. King County purchases only new tires for passenger vehicles, through Washington State contracts.

Prognosis

Reaction to retreaded tires is almost entirely positive, especially when they are used on non-steering axles of trucks. Because of their substantial environmental benefits and large financial savings, they are highly recommended for these uses. No organizations we contacted reported purchasing retreads for steering axles, small trucks or passenger cars, but the Tire Retreading Information Bureau claims that there is no reason to exclude these applications of retreaded tires, provided that casings of high quality are available. Purchasers were generally happy with both purchased retreaded tires and retread service.

TRIB stresses the importance of visiting retreading plants before selecting a vendor. Because the inspection step of the retreading process is so important, a clean, well-organized shop is essential. TRIB recommends limiting the initial purchasing contract to three months as a way to determine if the vendor can meet the fleet's needs.

Sources:

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"News Releases About Tires," The Tire Retread Information Bureau, 408 372-1917

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"Recommended Practices for Incorporating Federal Tire Program in State and Local Government Procurement of Retread Tires and Retread Services," June, 1992, General Services Administration, Federal Recycling Program, 703 308-4673

Federal Tire Program: Alert Notice.

SOY-BASED INKS

Soy-based inks are printing inks which contain anywhere from 7% to 55% soy oil by volume, and generally have significantly lower VOC ratings than most petroleum inks. (United Soybean Board) Originally developed during the oil shocks of the late 1970s as an alternative to petroleum based inks, soy-based and other vegetable oil-based inks have captured a substantial market share, especially in the news ink market. Most soy inks, however, still contain some component of petroleum oil. Growth of vegetable oil inks has been boosted by the passage of a Congressional Act which mandates that printers with government contracts use these inks wherever possible. (Lustig, 1995) Ten states require the use of soy based ink whenever possible for state printing jobs (Nebraska, 1993).

The environmental costs and benefits of using soy inks remain somewhat uncertain. While most soy inks contain a substantially lower percentage of VOCs compared to conventional petroleum inks, emissions from inks contribute approximately only 1% to total VOC emissions associated with printing. The remaining 99% are due to VOC emissions from blanket and roller cleaners. The data from an EPA study suggests that the amount of blanket and roller cleaner needed does not vary significantly between conventional and soy inks. (Miller et al., 1993)

Although there has been little research performed on the economics of soy versus petroleum inks, compared to labor, equipment, and paper costs, the cost of ink is relatively small. Soy inks are slightly more expensive by the pound, but they tend to spread further, which minimizes cost differentials between soy and petroleum inks. One drawback of vegetable oil-based inks is that their lower volatility results in longer drying times, a potentially significant cost. On the other hand, it has been reported that deinking during the paper recycling process is easier and causes less fiber damage when the paper has been printed using soy ink. (Miller et al., 1993)

The general consensus on print quality seems to be that soy inks perform as well or even better than conventional petroleum inks in most situations. Because soy oil is lighter in color than petroleum, colors appear brighter on the page if printed with soy inks. Vegetable oil-based inks reportedly also flow more smoothly, resulting in fewer spoiled sheets. (TURI, 1994)

Among those organizations and agencies which responded to the Abt survey, the states of Minnesota, Missouri, Nebraska, and New York have active contracts set up for purchasing soy-based inks. In addition, Aquapore Moisture Systems, Inc. and Bell Atlantic Corporation reported that they use soy inks in some of their printing applications (e.g., Bell Atlantic's phone directories). In general, purchasers seem to have only a vague understanding of the issues involved with alternative inks, and do not focus on them in their purchasing policies. As a result, detailed statistics of soy ink purchases are not kept by most of the respondents whom we contacted.

In the paragraphs that follow, we provide further data for the states we contacted to discuss the viability of purchasing soy inks.

Minnesota

The State Administration Department reports that approximately $7,000 of soy inks are purchased every year by the state. Information was not available regarding the applications for which this ink was used, or the percentage of soy inks purchased compared to total ink purchases.

The Minnesota State Printing Office actively pursues environmental goals, and uses a combination of conventional inks, soy inks, Agri-Tek inks, and recycled Envirecycle inks. The Office started using soy inks in late 80s, after Flint Ink developed a viable sheetfed soy ink. Since soybeans are Minnesota's second largest cash crop, at the time there was a significant incentive involved in encouraging the use of soy inks.

The point of view of the Printing Office is that soy inks are no longer considered the cutting edge in the world of environmentally preferable inks. Agri-Tek inks contain a larger component of vegetable ingredients, and have good performance characteristics. Envirecycle inks are made from reclaimed waste ink. Although Agri-Tek and Envirecycle inks cost more than soy or conventional inks, ink costs are a small percentage (3-5%) of total printing costs.

Missouri

Missouri requires that soy inks be used wherever possible for state printing jobs, and requires contractors (who do the majority of state printing) to use soybean based inks. If necessary, purchasers are allowed to exercise a 10% price preference to buy soy inks. There are no purchasing specifications for soy inks, only that they be called "soy inks" by the manufacturer. In addition, costs and volumes of inks used are not tracked, as they are folded into the overall printing contracts. Because of this, vendors and availability are also unknown. There have been no reported problems with either performance or customer acceptability. State documents printed with soy inks are labeled as such. There are no plans to change the regulation, or to set up more stringent specifications for what are considered soy inks.

New York

New York's Office of General Services (OGS) has a number of contracts set up for purchasing soy-based inks. Contractors supply inks directly to state agencies on demand, and report back to OGS only total ink purchases, without breaking out the various ink types. As a result, OGS does not have statistics on soy ink purchases.

Prognosis

Market share of soy inks is increasing, as more and more printers wishing to be environmentally conscious begin to incorporate them into their operations. Good performance of soy inks in many printing applications adds to the appeal of soy inks, and there appears to be a large number of vendors offering a variety of different types of soy inks. Soy inks also are cost competitive with petroleum-based inks. Therefore, it should be reasonably easy to include the purchase of soy inks into DPGS's environmentally preferable products procurement policy.

Furthermore, the use of soy inks may be associated with a modest environmental benefit, due to the reduction in VOC emissions. It should be noted, however, that in printing it is the cleaning and fountain solutions that produce by far the majority of VOC emissions.

It is important to pay attention to the amount of soy oil in inks. Some heatset "soy inks" qualify for the American Soybean Association's SoySeal with as little as 7% soy oil content by weight. In addition, there are a number of alternatives that may be worth examining, including other vegetable-based inks and recycled inks, such as Agri-Tek and Envirecycle. Still other alternatives might include water-based inks and radiation-curable inks.

Sources:

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CHAPTER 4: RECOMMENDATIONS

In this chapter, we translate the information provided in the previous chapters into recommendations for DPGS. The focus of our recommendations is product-specific. That is, we recommend product-attribute combinations that DPGS should strongly consider adopting immediately as EPP standards as well as those product-attributes that may provide opportunities to improve the environment in the longer term. While the data we gathered from EPP users provide solid indications of the desirability of adopting the product standards, in some cases, DPGS should further investigate details that were not fully clarified by the current users.[8] Our recommendations take into consideration that Massachusetts is relatively advanced in the purchase of EPPs, having existing EPP standards for a number of products. Certain product-attributes are not mentioned because Massachusetts already has standards for them or is investigating them separately. The reader should be aware that environmental criteria for many products not specifically recommended in this report may be worth adopting.

PRODUCT-SPECIFIC RECOMMENDATIONS

We have adequate information to make a recommendation regarding the adoption of EPP standards only for those eleven products for which we gathered information in addition to that obtained from the survey (see Chapter 3). As discussed in Chapter 3, these products were chosen, with input from DPGS, based on: (1) the frequency with which respondents to the questionnaire mentioned a product standard; (2) the dollar value of Massachusetts Executive Agency purchases of the product; (3) the apparent environmental impact of the environmentally-preferable product in comparison to the commonly purchased product; and (4) whether DPGS already had adequate in-house information on the product. Due to differences in the purchasing status of non-chlorine bleached printing/writing paper in comparison to tissue paper, we split this product group into two for purposes of recommendations. We present our recommendations in three categories:

(1) EPP standards that appear highly effective. Based on the information presented in the previous chapters, the product-attributes in this category can be obtained at *little or no additional expense* and are associated with a *significant environmental benefit*. Our consideration of cost includes the product's performance and availability as well as any price premium demanded for the product. We recommend that DPGS proceed immediately towards adopting these product-attributes as EPP standards.

(2) EPP standards that appear effective. Based on the information presented in the previous chapters, the product-attributes in this category can be obtained at *little or moderate additional expense* and are associated with *moderate environmental benefits*. We recommend that DPGS actively continue to investigate the adoption of these product-attributes as EPP standards. We outline specific areas of investigation.

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[8]DPGS's decision to 'adopt' environmental attributes into the procurement process may take a variety of forms including price preferences, mandated minimum standards, or the provision of information regarding the product to purchasers. We do not recommend specific implementation measures.

(3) EPP standards that do not currently appear effective. The costs of obtaining product-attributes in this category appear to outweigh the environmental benefits of the products. We recommend that DPGS continue to monitor the status of these products.

EPP standards that appear highly effective

1. *Retreaded tires*

   Retreaded tires for non-steering truck axles are in common use. Many organizations are purchasing retreaded tires solely due to the associated economic savings. Retreaded tires for non-steering truck axles are commonly assessed as performing as well as new tires. Massachusetts' expenditures for tires are substantial. Also, there appears to be a significant environmental benefit associated with using retreaded tires due to waste reduction and natural resource conservation. We recommend the purchase of retreaded tires for non-steering truck axles.

   Areas for further investigation: Further investigation is needed prior to using retreaded tires for passenger cars, steering axles, and high performance vehicles. Use of retreaded tires on passenger cars may not be economical while the adequacy of retreaded tires on steering axles and high performance vehicles is controversial. DPGS could evaluate the experience of those organizations using retreaded steering tires (e.g., UPS, Federal Express, and the U.S. Postal System) and organizations using retreads on ambulances and fire trucks. DPGS should also ensure the quality of operation of any retreading facility with which it contracts because the careful inspection of the used casing is vital to satisfactory performance of the tire.

2. *Re-refined motor oil*

   Re-refined oil makes up the great majority of motor oil purchases for an increasing number of state and local governments. Performance of re-refined oil is at least equivalent to that of virgin oil, while re-refined oil appears to be strongly cost-competitive. The reduction in the quantity of waste oil entering the environment substantially benefits the environment. We recommend the purchase of re-refined oil for vehicles (other than aircraft).

   Areas for further investigation: While the U.S. EPA recommends that lubricating oil contain at least 25 percent re-refined oil, oils consisting of 100% re-refined basestock are available. Given equivalent performance and price, we recommend DPGS locate vendors of 100% re-refined oil.

3. *Printing/Writing Paper with post-consumer recycled content of 20% or greater*

   Several government agencies are currently purchasing printing/writing paper with post-consumer recycled content of at least 20 percent. (See Chapter 3.) These agencies generally report good performance of the paper. Printing/writing paper is one of the largest components of expenditures made through DPGS. Further, purchasing paper with recycled content contributes significantly to diverting waste from the solid waste stream

and reducing energy use. We recommend the purchase of printing/writing paper with 20% post-consumer content.

Areas for further investigation: Our research indicated that the price differential between paper with 10% post-consumer content and 20% post-consumer content is minimal. Paper with post-consumer recycled content exceeding 20% is expected to be available only at a substantial price premium. For this level of post-consumer content, however, product price and availability appear to be somewhat erratic. We recommend that DPGS assess the current price of paper with post-consumer recycled content greater than 20% through a request for bids.

4. *Computer hardware - energy efficiency*

Several government agencies (e.g., Connecticut and Ohio) currently adhere to EPA's *Energy Star* standards when purchasing computers, monitors, and printers. The majority of all desktop computers and printers sold domestically meet the *Energy Star* specifications. The price and performance of *Energy Star* computers and printers are not expected to differ from those computers and printers not meeting the standards. Further, Massachusetts spends substantial funds on computers and printers. The use of computer hardware meeting *Energy Star* specifications can result in considerable energy savings and, thus, reduce operating costs. We recommend the purchase of computer hardware meeting *Energy Star* specifications.

5. *Non-chlorine bleached and unbleached tissue paper*

We were unable to locate state purchasers who were knowledgeable about this product through our survey. However, a major tissue paper vendor indicated that unbleached and non-chlorine bleached tissue are widely purchased. There appear to be no performance concerns with using unbleached or non-chlorine bleached tissue. Clearly, there is no performance need for a brightness standard for tissue. Further, unbleached and non-chlorine bleached tissues are reportedly priced competitively with the equivalent chlorine-bleached products. Because the risks associated with chlorine bleaching may be significant and there is no performance need for brightness in tissue, we recommend that DPGS purchase unbleached tissue paper.

Areas for further investigation: We recommend that DPGS identify users of unbleached tissue through paper vendors and other means. DPGS should confirm with these users that costs are competitive and performance is satisfactory.

6. *Compost*

Through our survey, we identified two states with purchasing specifications for composted materials. Other states are also known to use compost but may not report the procurement of compost because the compost is produced in state facilities. Within Massachusetts, municipal composted yard trimmings are used with applications at landfills, cemeteries, and ball fields, for example. The State Highway Department has also required contractors to use compost for certain projects. In Massachusetts, compost

is priced comparably to top soil. However, the mixture of compost and sub-soil can be less expensive than top soil. The use of composted materials is logical both from the standpoint of reducing the solid waste stream and to enrich soils. We recommend that the State purchase composted yard trimmings for selected applications.

Areas for further investigation: We recommend DPGS work with DEP to identify and target appropriate uses for composted yard trimmings. It may be most efficient to develop bid specifications following the issuance of compost standards by the Coalition of North East Governors.

EPP standards that appear effective

1. *Less and non-toxic cleaning products*

Several organizations reported purchasing less and non-toxic cleaning products, with generally adequate performance at a competitive price. However, no widely accepted standards delineate cleaning products that are 'less toxic' and/or biodegradable. According to organizations we contacted, the establishment of such standards and the identification of vendors with products that meet these standards can be extremely time consuming. Thus, for this product category it may be most efficient to adopt the standards of an organization that has already invested the required time. For example, the city of Santa Monica's toxic use reduction program for cleaning products could serve as a model.

Areas for further investigation: We recommend DPGS conduct an in-depth review of a small number of toxic use reduction programs for cleaning products (e.g., Santa Monica's program, GSA's program) to determine whether an existing program could usefully be adopted. DPGS should consider the attributes of cleaning products that they want to eliminate, for example, materials that are hazardous to workers, toxic to aquatic life, or non-biodegradable. One means of simplifying a procurement program for cleaning products is to purchase a few products which are used for multiple purposes, such as a single cleaner for glass and porcelain surfaces. DPGS should consider the complexity of vendors' product lines and the associated research effort into environmental impacts in their procurement decisions.

2. *Soy-based inks*

The availability, performance, and price differentials of soy-based inks compared to petroleum-based inks all favor the adoption of soy-based inks as a preferable product. Switching to soy-based inks also appears to result in a modest environmental benefit. Soy-based inks generally contain a substantially lower percentage of volatile organic compounds (VOCs) compared to petroleum-based inks. However, emissions from inks contribute approximately only one percent of total VOC emissions associated with lithographic printing.

Areas for further investigation: We recommend that DPGS further investigate the benefits of soy inks other than reduced VOC emissions, such as improving the paper recycling

process and reducing demand for petroleum. We also recommend that DPGS research the cost, performance, and environmental benefits associated with inks made from reclaimed waste ink. Waste inks often contain toxins and the reclamation of these inks reduces the introduction of toxins into the environment.

3. *Non-chlorine bleached printing/writing paper*

Printing/writing paper is one of the greatest expenses for Massachusetts Executive Agencies. Thus, its environmental impacts merit consideration. To date, however, states have focused primarily on the recycled content of printing/writing paper rather than the bleaching method. As was the case for unbleached tissue, our survey did not reveal state purchasers knowledgeable about this product. While we identified a few government organizations that are evaluating the purchase of printing/writing paper manufactured without the use of chlorine compounds, most of these organizations have not instituted any preference for non-chlorine bleached products. Organizations appear to be waiting for guidance from the U.S. EPA regarding this controversial issue in part because there have been significant technological changes in the past few years. However, several vendors offer non-chlorine bleached printing/writing paper. We recommend pursuit of this product because of the level of state purchases, the product availability, and the potential environmental risk rather than any knowledge about the successful use of non-chlorine bleached printing/writing paper by other states.

Areas for further investigation: We recommend that DPGS request paper vendors to report the bleaching methods both for recycled fibers and virgin fibers and also evaluate the non-chlorine bleached papers produced by the manufacturers listed in Chapter 3. DPGS should evaluate the performance (including brightness) and cost of these paper. All other factors being comparable, bleaching virgin pulp without chlorine compounds would be preferred to bleaching with chlorine compounds. Ideally, recycled pulp would not be rebleached.

4. *Carpeting from recycled materials*

Purchasers of carpeting from recycled polyethylene terephthalate offer mixed reviews. Some reports indicate that the carpet fades and wears more rapidly than carpeting from new materials. Also, carpet from recycled materials may be relatively expensive. However, other users have found the performance of recycled carpet to be satisfactory and the costs to be competitive. Because the experience of some organizations with recycled carpet has been successful, we recommend DPGS consider this means of diverting waste from the solid waste stream and of preserving natural resources.

Areas for further investigation: We recommend DPGS proceed by comparing the costs of recycled vs. new carpeting and requesting the results of any accelerated aging tests conducted by the vendors. If performance and price are found to be acceptable, DPGS should purchase and evaluate a small area of recycled carpeting prior to entering into larger price agreements.

EPP standards that do not currently appear effective

1. *Organic food*

   None of the respondents to Abt Associates' survey reported purchasing organic food. Tufts University (Medford, MA) has recently instituted purchasing of limited quantities of organic produce. However, they paid a substantial price premium ranging from 40 to 100 percent. More typically, organic foods are expected to cost about 25 percent more than conventionally grown foods. Despite the benefit of reduced introduction of toxins into the environment, the current price premium demanded for organic foods is unlikely to be affordable.

2. *De-icers and anti-skid agents*

   Anti-skid agents, consisting largely of road salt, are one of the largest purchase categories for Massachusetts Executive Agencies. Calcium Magnesium Acetate, or CMA, appears to be strongly environmentally preferable to road salt, in that it is less toxic to plants and wildlife. Currently, Massachusetts Executive Agencies purchase a relatively small quantity of CMA, presumably for use in highly sensitive areas. However, wholesale replacement of road salt with CMA is cost prohibitive. At this time, there does not appear to be any cost effective alternative to road salt that is environmentally preferable.

In addition to the twelve product-attributes categorized above, DPGS earmarked several other product-attributes as candidates for further investigation. The products were chosen using the same criteria as were used to select the twelve priority products. (See Chapter 3.) The resources available for this project did not allow for research into the costs and benefits of adopting these product standards. However, all of these products are currently being purchased by at least one respondent to Abt Associates' survey indicating that some organizations have judged purchase of these products to be effective. Thus, we recommend that DPGS pursue data on the costs and benefits of purchasing these products, listed below.

Products recommended for additional research (e.g., product availability, product performance, price differentials, environmental benefits):

- Concrete from recovered materials
- Energy efficient appliances
- Energy efficient and alternative fuel vehicles
- Energy efficient lighting
- Insulation from recycled materials
- Less toxic caulking
- Plastic bags from recycled materials
- Plastic pipes from recycled materials
- Products from used rubber
- Re-refined antifreeze
- Rechargeable and less toxic batteries
- Recycled and recyclable packaging
- Recycled and less toxic paint

- Wood debris chips for landscape

EPP PROGRAM RECOMMENDATIONS

In addition to the product-specific recommendations provided above, we briefly offer two broader recommendations regarding Massachusetts' EPP purchasing program. First, we recommend that Massachusetts coordinate their EPP purchasing with purchasing agencies in other states. This project has proven that many states are pursuing EPPs and that the accumulated research and experience can be beneficially shared. The level of coordination could range from initiating an electronic bulletin board on EPPs that would allow for ongoing exchange of information to issuing combined requests for bids for certain EPPs. Such coordination with other states can reduce product research costs, assist Massachusetts with staying up to date with EPP purchasing practices, and, in some cases, may increase market power and draw new vendors to the market. We provide specific suggestions regarding state contacts and means of communication in a memorandum delivered to DPGS under this contract entitled, "*Remaining Current with Environmentally Preferable Product Standards"*.

Second, we recommend that Massachusetts consider choosing one or more standard setting organizations (e.g., Energy Star, Environmental Choice, Blue Angel, Green Seal) to rely on for guidance in developing their EPP purchasing program.[9] The level of involvement with such a program could have a broad range. At a minimum, Massachusetts could commit to simply obtaining and reviewing all the EPP standards developed by the organization. Used in this manner, the standard setting organization could serve to indicate new EPPs available and changes in product criteria that Massachusetts may want to adopt. At the other extreme, Massachusetts could commit to adopting the standards set by another organization. Coordination with a standard setting organization has benefits similar to coordination with other states: reduced product research costs, assistance with staying current with EPP purchasing practices, and, to the extent that other organizations adhere to the same standards, increased market power.

To choose one or more standard setting programs to rely on for guidance, Massachusetts should consider the following issues:

- For what products does the program currently have standards? Are the major products of concern to Massachusetts covered? Is the product coverage adequately extensive?
- Do the product criteria cover a broad range of attributes (e.g., toxicity, recyclability, energy efficiency)? Are the means by which product criteria are chosen transparent to the user? Is there adequate justification for the criteria? Was input regarding the criteria obtained from the entire range of interested/affected parties?

- Is the program stable, i.e., is funding available and does the program have broad acceptance?

[9]See Chapter 2 for a description of these organizations.

- Does the program certify the environmental claims of vendors? If the program does not certify claims, can Massachusetts obtain satisfactory certification via other means such as the written verification of vendors? If the program does certify claims, would the costs to vendors be prohibitive, especially to small vendors?

- Does the program offer assistance/advice to its adherents? Does the program publicize the activities of its adherents?

The combination of efficient contacts with state purchasing agencies and employing the services of standard-setting organizations should ensure that Massachusetts is aware of innovative and advanced EPP purchasing practices and opportunities.

APPENDIX A

17 Priority Chemicals Targeted by EPA's 33/50 Program

Benzene
Cadmium and compounds
Carbon tetrachloride
Chloroform
Chromium and compounds
Cyanide compounds
Dichloromethane
Lead and compounds
Mercury and compounds
Methyl ethyl ketone
Kethyl isobutyl ketone
Nickel and compounds
Tetrachloroethylene
Toluene
1,1,1-Trichloroethane
Trichloroethylene
Xylenes